

FLIGHT

First Aero Weekly in the World.

Founder and Editor: STANLEY SPOONER.

A Journal devoted to the Interests, Practice, and Progress of Aerial Locomotion and Transport.

OFFICIAL ORGAN OF THE ROYAL AERO CLUB OF THE UNITED KINGDOM.

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Flight.

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TO OUR READERS.

The Supply of "FLIGHT." Important Notice.

Order "FLIGHT" to be either delivered or reserved for you regularly.

As the demand for "FLIGHT" is so great each week, it is of the utmost importance that readers should place their orders *firmly* for copies of "FLIGHT" at the bookstalls, their newsagents, or direct from the publishers, at 44, St. Martin's Lane, W.C., if they wish to secure a copy every week and avoid disappointment. The stringent Government restrictions in regard to the supply of printing paper necessitates this precaution in order that only actual numbers required are printed, and all wastage by unsold copies may thereby be reduced to a minimum, if not eliminated.

THE PUBLISHERS.

EDITORIAL COMMENT.

As a very illuminating example of the utterly putrid condition of politics as "she is practised" in this 20th century, the campaign of personalities against Mr. Pemberton Billing, M.P., in one of the Liberal morning "ha'pennies," would be hard to beat. From this it may be inferred that *somebody* has felt the draught pretty badly over the stirring up which the introduction into Parliament of the member for East Herts has brought about in the political dovecots. So far from carrying a stigma with them, the relation of the

Politics and Personalities.

varied experiences of "P.B." is much more likely to bring with it a widespread wave of sympathy. Nothing that appeared in the first two articles of what were, we presume, intended to be "horrible disclosures" could, by the veriest stretch of the imagination, be regarded as happenings for any man to be ashamed of. In fact quite the contrary. The facts—assuming them all for the moment to be facts—as marshalled merely, in our opinion, went to demonstrate the remarkable versatility of the member for Herts. Many men who have subsequently risen to high pinnacles of honoured fame have led as varied and as roving a life as is, in these articles, credited to "P.B." Their experience of the world has enabled them to take a broader and more imaginative view of matters material and obtain a grasp of possibilities which in so many of our present lawyer politicians seems to be entirely absent. In handling the attack boldly in the House, as Mr. Pemberton Billing did, he showed his good judgment, and there are few, we think, who will not agree with Mr. Billing's characterisation of these articles as "vulgar abuse." We have as little patience with this form of political intrigue as we had with Mr. Billing's ill-judged methods of stating his cause in the first days of his Parliamentary career. Had it not been for the entrance into the arena of Mr. Lanchester in a third article in the same morning paper, Mr. Billing would have been entirely justified in treating the two initial articles with the contempt which they deserved. Mr. Lanchester is, however, a man and a scientist to be listened to, and his views are always worthy of being treated with the highest respect. Therefore it was sound judgment on Mr. Billing's part that he should at once have taken this portion of the wrangle up in Parliament, and given his personal explanations of the accusations of bad faith which were being

brought against him. As to how far Mr. Lanchester has made good his view of the position as set out in his tabulation of various statements—or, as Mr. Lanchester termed them, inventions—which he attributed to Mr. Billing, side by side with what Mr. Lanchester claimed to be the real facts, is not at all clear. There are many “facts” which by means of bald statements shorn of all their surroundings would appear to be unanswerable. But we are inclined to encourage a rather closer investigation into the details of sweeping accusations, such as those being scattered about just now, rather than accept the bare “Yes” or “No” style of thing, so often insisted upon for reply by legal luminaries in our Courts of Justice. We hold no special brief on Mr. Billing’s behalf, who is well able to take care of himself, but we are sorry that so eminent a scientist as Mr. Lanchester should appear to have been sucked into the cesspool of politics. Many, many things are said by all and sundry during election campaigns which would never be expected to bear the light of legal cross-examination, but then that is “politics” as practised at the present day. And the pity of it. Possibly Mr. Billing was not as careful in the painting of his word pictures, when he was addressing the dozens of meetings which he held during his election campaign, as he would have been had he thought he would have presently to justify all his frothings. In the House he made the same initial mistake, but, fortunately for him, grasped the situation at an early stage, and has since been much more circumspect in his methods. He may well be forgiven a good deal in this direction, when the same highly-strung energy finds such spontaneous vent as in Mr. Billing’s solicitude to obtain on Tuesday an assurance from the Prime Minister that the traitor, Sir Roger Casement, should forthwith be shot. He had the whole House with him, in spite of his unparliamentary way of expressing his feelings. On the whole, therefore, if there is any justification for it at all, it would have been much better had those who are manipulating the political strings behind the scenes, waited a little more patiently before they set out on their “vulgar abuse” articles, at least until such time as the Committee which was asked for by

Mr. Billing and granted by the Government, to inquire into the serious allegations regarding the Air Services, of the member for East Herts, had given the findings of their investigations. The report of this Committee, which, we trust, will not be delayed, will, we hope, clear the air from a good deal of existing trouble, and possibly lead to a better understanding all round, and induce Mr. Billing—*inter alia*—to modify some of his more violent assertions. We cannot, however, regard with unmixed feelings the announcement of the Prime Minister to the effect that it is to Lord Curzon that the Cabinet is looking to report upon the aircraft situation, and to recommend a plan for re-organisation. Lord Curzon commands our respect and esteem, but it would be instructive to learn upon what experience he proposes to found his plan for setting right so highly a scientific and technical problem as aviation. If he is merely to pass opinions upon various constructive schemes placed before him, his judgment may, in a general sense, prove of value, but in the handling of such a new and vital factor as aviation is proving itself to be, the selection of amateur stock on to which to graft an entirely new organisation, appears to us to be a perilous experiment at the present moment. On Friday next Lord Montagu is to be heard again upon this question of the hour—this time in London at the Queen’s Hall—and we shall hope to hear more direct information upon this occasion than has hitherto been vouchsafed for public consumption. The meeting, which is being organised by the Navy League, will carry very considerable weight, even in political circles, as prominent men of all views are supporting the object for which the meeting is called, viz., to advocate the appointment of a Board of Aviation. So long as this Board obtains adequate powers to administer to the requirements of the Nation’s Air Service, it should suffice for the time being to fill the gap, until a full-blown Air Ministry can be brought into being. Mr. Robert Yerburgh, the President of the Navy League, who will occupy the chair, is an earnest and forceful speaker. He knows the necessities of the cause, and we should look for valuable results, now that the League has taken hold of the whole question afresh.

THE ROLL OF HONOUR.

THE Secretary of the Admiralty announces the following casualties :—

Under date April 16th : **Wounded.**

Flight Sub-Lieutenant Robert Souray, R.N.

Under date April 21st : **Killed.**

Flight Sub-Lieutenant Arthur C. Saw, R.N.

Probationary Flight Sub-Lieutenant William Hocking, R.N.

Under date April 20th : **Severely Injured.**

Flight Sub-Lieutenant Russell Douglas, R.N.

Under date April 23rd :

Flight Sub-Lieutenant John D. Marvin, R.N.

Under date April 22nd : **Slightly Injured.**

Flight Sub-Lieutenant Augustine F. Marlowe, R.N.

Under date April 23rd :

Flight Sub-Lieutenant Christopher J. Galpin, R.N.

The following casualties have been announced by the War Office :—

Killed.

Lieutenant-Colonel D. S. Lewis, D.S.O., R.E. and R.F.C.

Previously reported Missing, now reported Killed.

Second Lieutenant D. A. Glen, Manchester Regt. and R.F.C.

Wounded.

Lieutenant C. W. E. Cole-Hamilton, R. Scots and R.F.C.

Second Lieutenant E. G. E. Donaldson, R.F.A., attached

R.F.C.

Second Lieutenant F. G. Russell, R.F.A., attached R.F.C.

Second Lieutenant R. L. Graham, R.F.A., attached R.F.C.

3053 1st Class Air-Mechanic H. G. W. Lock, Royal Flying

Corps.

7292 1st Class Air-Mechanic W. R. Gilbert, Royal Flying

Corps.

Previously reported Missing, now reported

Wounded and Prisoner of War.

Second Lieutenant L. R. Heywood, R.E. and R.F.C.

Officially reported Missing, and Unofficially reported

Killed.

Second Lieutenant W. S. Earle, Royal Flying Corps.

Officially reported Missing, and Unofficially reported

Wounded and Prisoner of War.

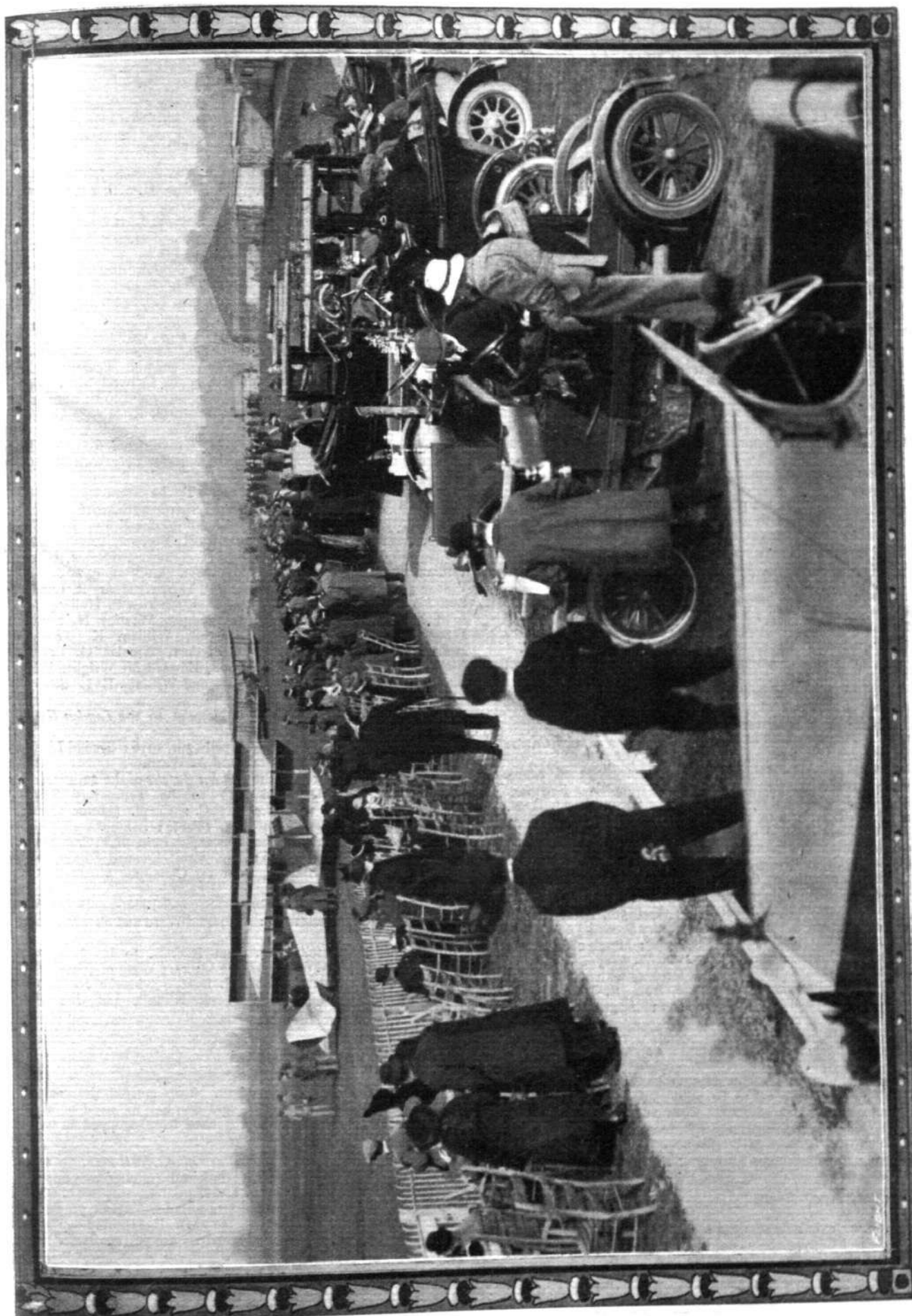
Second Lieutenant C. W. P. Selby, R. W. Kent Regt.,

attached R.F.C.

The Royal Flying Corps Hospital.

THE splendid work which is being done by the Royal Flying Corps will benefit greatly by the beneficence of the Lady Tredegar, who has lent her beautiful house at 37, Bryanston Square, W., to the hospital, and it is hoped to make a start in the new premises

on Monday. Lady Tredegar has given twelve beds, and is also contributing liberally to the maintenance fund. H.R.H. Princess Christian has promised a substantial donation towards the cost of equipment, and Lady St. Helier has also presented some beds, together with some other practical gifts, besides obtaining financial assistance.



The delightful spring weather has already had its effect on Hendon, and the above is a Saturday scene, the flying attracting quite a goodly number of visitors to witness the excellent flying which is almost continually in progress.

The British Air Service

"PER ARDUA AD ASTRA"

UNDER this heading are published each week the official announcements of appointments and promotions affecting the Royal Naval Air Service and the Royal Flying Corps (Military Wing) and Central Flying School. These notices are not duplicated. By way of instance, when an appointment to the Royal Naval Air Service is announced by the Admiralty it is published forthwith, but subsequently, when it appears in the LONDON GAZETTE, it is not repeated in this column.

Royal Naval Air Service.

THE following appeared among the Admiralty announcements of the 17th inst. :—

Flight-Commander H. A. Williamson promoted to Squadron-Commander, with seniority of April 14th.

Acting Squadron-Commander W. Briggs promoted to Squadron-Commander, with seniority of April 14th.

A. H. Allardyce and S. H. Gaskell, both entered as Probationary Flight Sub-Lieutenant (temporary), with seniority respectively of March 16th and April 13th, and both appointed to "President," additional, for R.N.A.S.

J. G. Bayes and A. S. Cheshire, both entered as Lieutenant and Sub-Lieutenant (temporary) respectively, R.N.V.R., with seniority of April 15th, and appointed to "President," additional, for R.N.A.S.

Temporary commissions as Lieutenant (R.N.V.R.) have been granted to N. H. Brandon and H. L. Rutty, with seniority of April 15th, and both appointed to "President," additional, for R.N.A.S.

The following appeared among the Admiralty announcements of the 19th inst. :—

Sub-Lieut. (R.N.V.R., temporary) B. O. Warren, promoted to Lieutenant (temporary), with seniority of April 17th.

The following have been granted temporary commissions as Sub-Lieutenant (R.N.V.R.), with seniority of April 17th, and appointed to "President," additional, for R.N.A.S. : A. N. Pennel (late Private 3rd Bn. Cameron Highlanders) and G. L. H. Douglas-Lane.

The following appeared among the Admiralty announcements of the 20th inst. :—

L. M. Bailey and I. J. Springfield, both entered as Probationary Flight Sub-Lieutenants (temporary), with seniority of April 19th.

The following appeared among the Admiralty announcements of the 24th inst. :—

Lieut. (R.N.V.R., Temporary) K. Secretan, to "President," additional, for R.N.A.S. ; May 24th.

Royal Flying Corps (Military Wing).

THE following appeared in a supplement to the *London Gazette* issued on the 17th inst. :—

Flying Officers.—April 1st, 1916 : Temporary Second Lieut. (Temporary Lieut.) W. St. J. Scott-Scott, from Res. Regts. of Cav., and to relinquish his temporary rank. Second Lieut. E. N. Holstius, Durh. L.I., and to be seconded. Second Lieut. H. A. Taylor, R. W. Kent R., and to be seconded. Second Lieut. J. S. Windsor, S. Wales Bord., and to be seconded. Second Lieut. M. L. Maguire, Conn. Rang., and to be seconded. Lieut. J. C. Russell, R.E., from a Flying Officer (Observer).

Suptg. Clerk William Edgar Aylwin, from R.E., to be Quartermaster, with the hon. rank of Lieutenant ; April 5th, 1916.

Memoranda.—From R.F.C. to be Temporary Second Lieutenants for duty with the Military Wing of that Corps ; March 28th, 1916 : Sergt. Francis T. Courtney and Corpl. Owen W. Clapp.

To be Temporary Second Lieutenants for duty with the R.F.C. ; April 15th, 1916 : Pte. Eric Bainbridge, from R. Fus. ; Sergt. Charles F. Reeve, from Aust. Imp. Fce. ; Sergt. Edmund S.

Williams, Winchester Coll. O.T.C. ; Pte. Adrian J. Court, from Aust. Imp. Fce. ; Pte. Tom W. Jay, from H.A.C. (T.F.) ; Pte. Roy M. Drummond, from Aust. A.M.C.

Supplementary to Regular Corps.—Second Lieutenants (on probation) confirmed in their rank : John R. Frankish, Robert Scott and Charles T. H. Vaisey.

The following appeared in the *London Gazette* of the 18th inst. :—**Flight-Commander.**—Lieut. A. Graves, Dorset Fort. Engrs., R.E. (T.F.), from a Flying Officer, and to be Temporary Captain while so employed ; April 3rd, 1916.

Flying Officers (Observers).—April 4th, 1916 : Capt. J. A. Denistoun, 8th Can. Inf. Bn. (90th Rif.) ; Temporary Lieut. R. S. McClintock, R.A. (T.F.) ; Temporary Lieut. J. T. Milne, Oxf. and Bucks L.I., and to be transferred to the General List ; Lieut. S. R. Stammers, Motor Machine Gun Service, and to be transferred to General List ; Temporary Second Lieut. G. R. Moser, Arg. and Sutbd. Highrs.

Memorandum.—Pte. Arthur T. M. Grove, from 61st Can. Inf. Bn., to be Temporary Second Lieutenant for duty with R.F.C. ; April 15th, 1916.

Supplementary to Regular Corps.—To be Second Lieutenants (on probation) : Richard L. Branner ; March 27th, 1916. Neville Kemsley, John M. Drysdale, William Roche-Kelly, James T. Hanning, Arthur G. Pinkney, Charles H. Vincent, Charles A. R. Shum, Harold F. Chapman, George R. Travis, Gilbert J. Harter, William Fraser, Charles E. Finlay, John A. Cowling, Arthur M. Pearson, Cyril W. Carleton, Howard R. Harker, Henry R. Lumley, Leslie A. Tapper, Geoffrey G. Callender, Charles S. Hollinghurst, John N. Holtom, Ambrose O. K. Wright, Westley N. Spragg, Percy W. Snell, Keith L. Caldwell, William K. Trollope, Montague J. Fenwick, John D. Stodart, Nicolas G. Caridia, Nicholas Comper, Richard P. Atwood, Edward M. Wright, Ernest B. W. Bartlett, Ivan B. Hart-Davies and William E. L. Seward ; April 15th, 1916.

The following appeared in a supplement to the *London Gazette* issued on the 19th inst. :—

Assistant Equipment Officers.—April 13th, 1916 : Second Lieuts., Special Reserve, T. W. Tattersall and A. Ward.

The following appeared in the *London Gazette* of the 20th inst. :—

Memoranda.—N.C.Os. and men to be Temporary Second Lieutenants for duty with the R.F.C. : Corpl. (Motor Cyclist) Arthur Harold Bowyer, from R.E. (T.F.) ; March 19th, 1916. 1st Class Air-Mechanic James Edwards, from R.F.C. ; March 26th, 1916. April 2nd, 1916 : Pte. Cecil Edward Pither, from A.S.C. ; Pte. W. G. Barker, from 1st Canadian Mounted Rifle Battalion.

Supplementary to Regular Corps.—Second Lieutenants (on probation) confirmed in their rank : Archibald Ward and Tom Whitaker Tattersall.

Memoranda.—The following, from R.F.C., to be Temporary Second Lieutenants for duty with the Military Wing of that Corps : 1st Class Air-Mechanic Raymond J. Everest ; March 26th, 1916. April 6th, 1916 : Flight-Sergt. Frank Nuttall, 2nd Class Air-Mechanic Alfred J. O. Spiers.

THE "X" AIRCRAFT RAIDS.

IN view of the decision of the Government not to allow details of places visited by enemy aircraft to be published, we are, as before, giving to each one an index number. Eventually, when details are available, we shall give the respective information under these index numbers, which will facilitate easy reference to each particular raid.

The following announcements have been officially issued, the date after the index number indicating when the raid occurred :—

"X 30" Raid, April 24th.

"War Office, April 24th.

"At 11.45 a.m. a hostile aeroplane appeared over Dover from the east and circled over the town at a height estimated to be 6,000 ft. Anti-aircraft guns at once came into action. The hostile machine was driven off. No bombs were dropped."

"X 31" Raid, April 24th.

"War Office, April 25th, 2 a.m.

"Three Zeppelins are reported to have come in from seawards

over the Eastern Counties last night. Two crossed the coast of Norfolk shortly before half-past 10, and another followed at about 11 o'clock. A few incendiary bombs have been dropped up to the time of the issue of this communiqué."

"War Office, April 25th, 3 p.m.

"Last night's air raid over the Norfolk and Suffolk coasts appears to have been carried out by four or five Zeppelins, only two of which made any serious attempt to penetrate inland. About 70 bombs appear to have been dropped. One man is reported seriously injured. No further details as to casualties are yet available."

"X 32" Raid, April 25th.

"War Office, April 26th, 3.30 a.m.

"Hostile airships raided the counties of Essex and Kent last night. Their number is uncertain but cannot have exceeded four. The raiders were met by a brisk fire from anti-aircraft guns, and retreated after they had achieved little or nothing."

In the last instalment of our series of constructional details the overhung mounting and cowling on tractor machines was dealt with. This week a few examples are shown of a different type of mounting in which the engine is carried between two bearers, one in front of the engine and one behind it. The overhung type possesses an advantage in that, owing to the absence of a bearer in front, the engine is very accessible, while on the other hand, when an engine is mounted cantilever fashion the supports must be made stronger than is necessary where the weight of the engine is divided more or less evenly between two bearers.

Yet a different type of mounting was employed in the old Morane-Saulnier all-steel machine. The six T section *longerons* supported one bearer just in front of the leading edge of the wings and converged to form a second one in front of the engine. The result was a structure of immense strength.

Of a more modern form are the bearers of the Grahame-White and Avro machines. In these the ball race of the front bearer is supported on tubular extensions of the *longerons*, the tubes serving at the same time as supports for the engine cowl.

In the sketches of the Blériot and one of the Nieuports the first mentioned type is illustrated. The Blériot is quite open in front and at the bottom, while the top

Intermediate between the partly open and all-enclosed types we have the cowling on the Sopwith scouts. In this machine the top cowl is carried down to the front bearer as in the above-mentioned machines, but the cowl is continued below the front bearer in order to reduce head resistance. That it does very effectively do so is proved by the excellent turn of speed developed by the Sopwith scouts. In order to admit more air to the engine housing openings have been cut in the cowling corresponding with those of the front engine bearer.

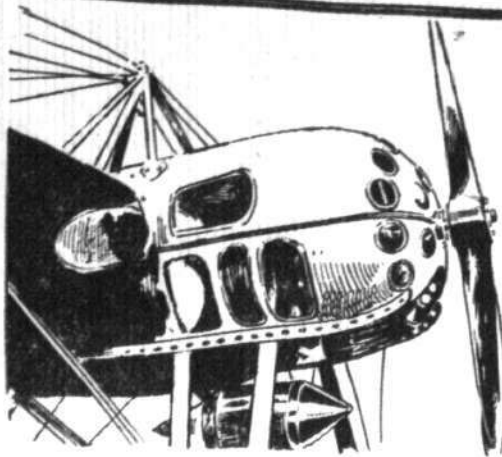
The second Nieuport monoplane shown was exhibited at the 1913 Paris Aero Salon. As regards the mounting of the engine it was the same as that of the Nieuport described above, but in order to reduce head resistance a hemispherical nose piece was mounted on and revolved with the propeller. Air was admitted to the engine housing through *louvers* cut in the nose piece, these *louvers* being so cut as to have a certain amount of "scooping" action. In the big Handley-Page monoplane the engine was also totally covered in, but here the nose piece was stationary.

* Previous sets of sketches in this series have appeared as follows :

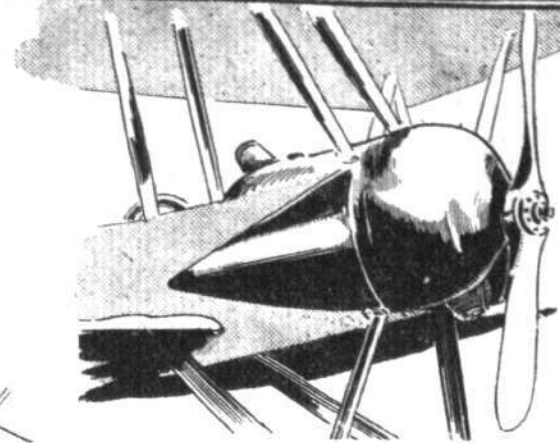
Any of these back numbers can be obtained from "FLIGHT" Office, 44, St. Martin's Lane, price 6d. each, post free.

CONSTRUCTIONAL DETAILS.—XIII.

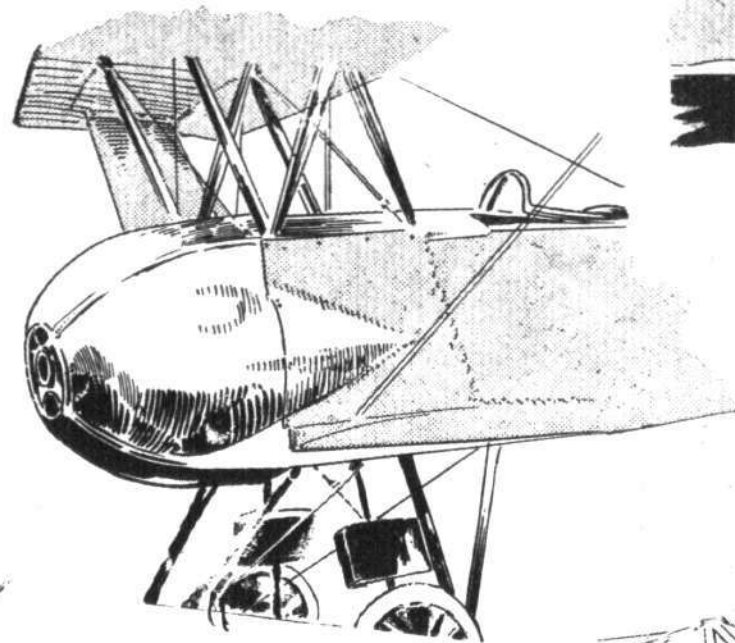
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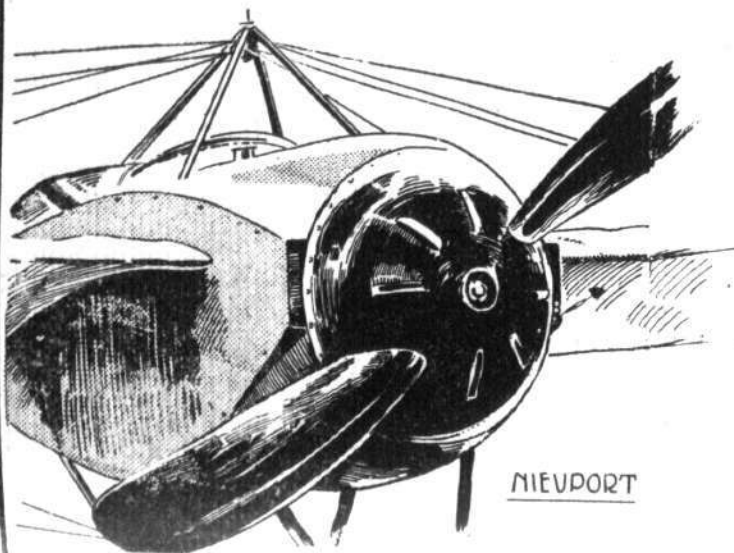
MORANE SAULNIER



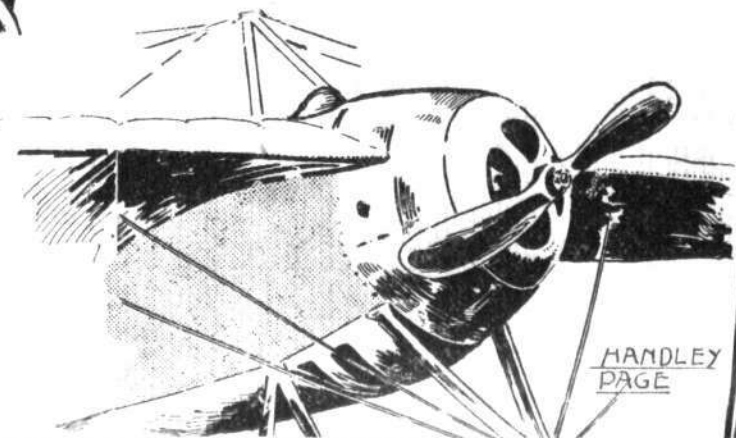
GRAHAME WHITE



AVRO

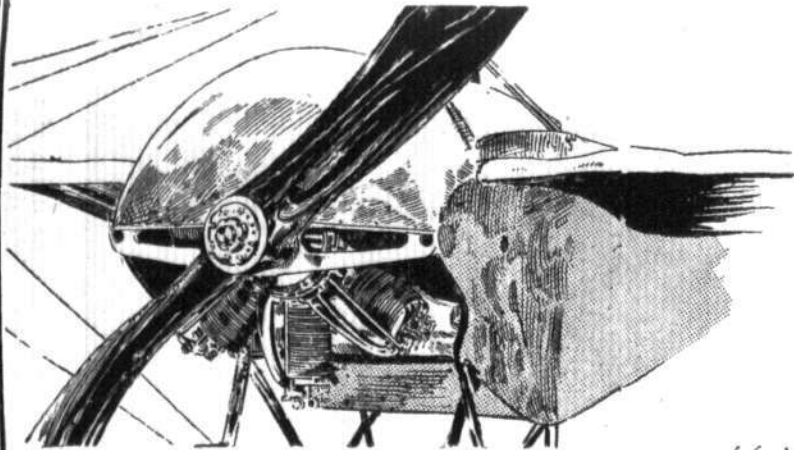


NIEUPORT

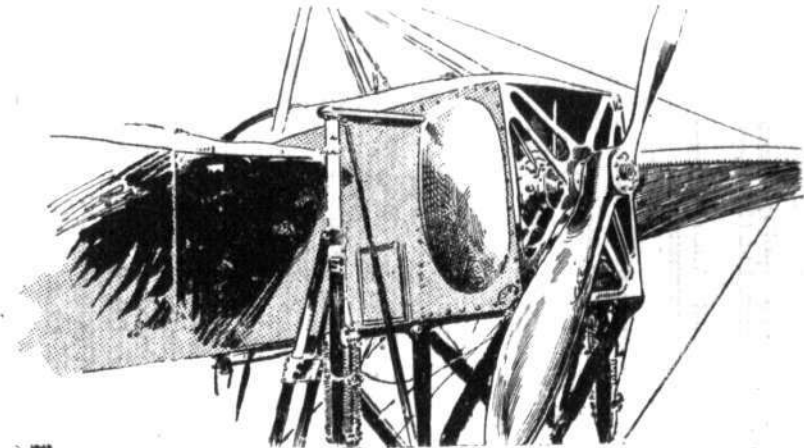


HANDLEY
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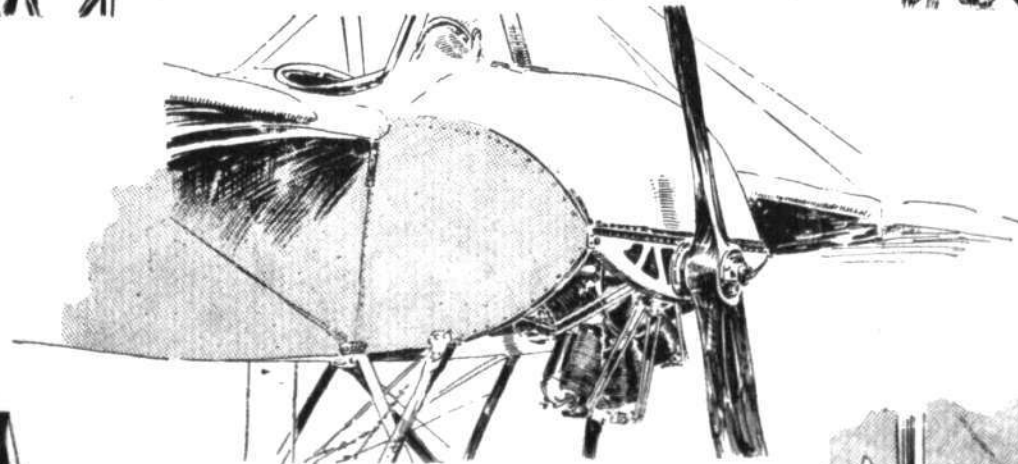
Engines mounted between double bearers, and their housings.



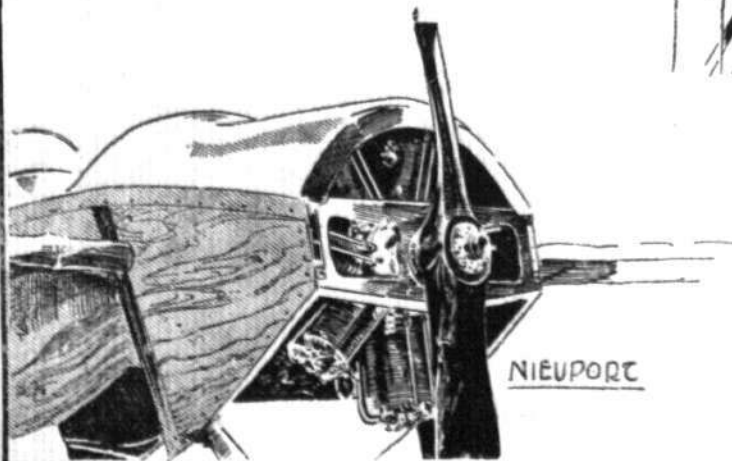
PONNIER



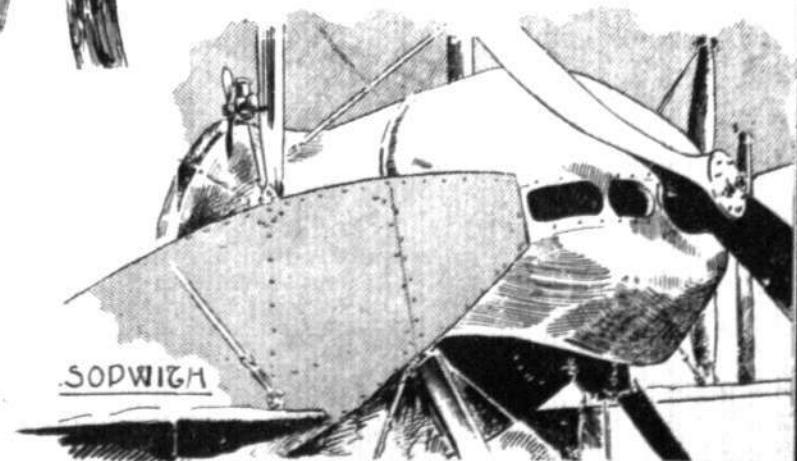
BLERIOT



BOREL



NIEUPORT



SOPWITH

Engines mounted between double bearers, and their housings. (Continued.)

THE FLYING SERVICES FUND—ADMINISTERED BY THE ROYAL AERO CLUB.

THE Flying Services Fund has been instituted by the Royal Aero Club for the benefit of officers and men of the Royal Naval Air Service and the Royal Flying Corps who are incapacitated on active service, and for the widows and dependants of those who are killed.

The Fund is intended for the benefit of all ranks, but especially for petty officers, non-commissioned officers, and men.

Forms of application for assistance can be obtained from the Royal Aero Club, 166, Piccadilly, London, W.

Subscriptions.

	£	s.	d.
Total subscriptions received to April 17th, 1916	10,613	19	6
Staff and Workers of Gwynnes, Ltd. (Fourteenth contribution) ...	9	10	0
Collected at the Westland Aircraft Works, Yeovil (Twenty-ninth contribution)...	0	7	2
Total, April 20th, 1916 ..	10,623	16	8

B. STEVENSON, Assistant Secretary.

166, Piccadilly, W.



London Aerodrome, Collindale Avenue, Hendon.

Beatty School.—Pupils out during last week: Messrs. Branford, d'Allesina, le Champion, Martin, Mossop, Sellars, Parsons, Knox, Smith, Brewerton, Phillips, Stanley, Tjaarda, Hick, Skeet, Earl, Cuthbert, Dowding, Davy and Gaskin.

Instructors: Messrs. G. W. Beatty, R. W. Kenworthy, G. Virgilio, A. E. Mitchell, H. Fawcett and H. Sykes.

Machines in use: Beatty-Wright dual-control and single-seater propeller biplanes and Caudron single-seater and dual-control tractor biplanes.

Capt. Jones flew for his certificate on the 16th.

Ruffy-Baumann School.—Pupils with instructor last week: Messrs. J. B. Thomas, jun., Williams, Carr, Edgar, Westlake, Winter, Hoskyns, di Balma and Capt.

Bailey. Straights or rolling alone: Messrs. Cox, Jones, Wood, Muspratt and Baron D'Opstael. Eights or circuits alone: Messrs. Cox, Wood and Baron D'Opstael.

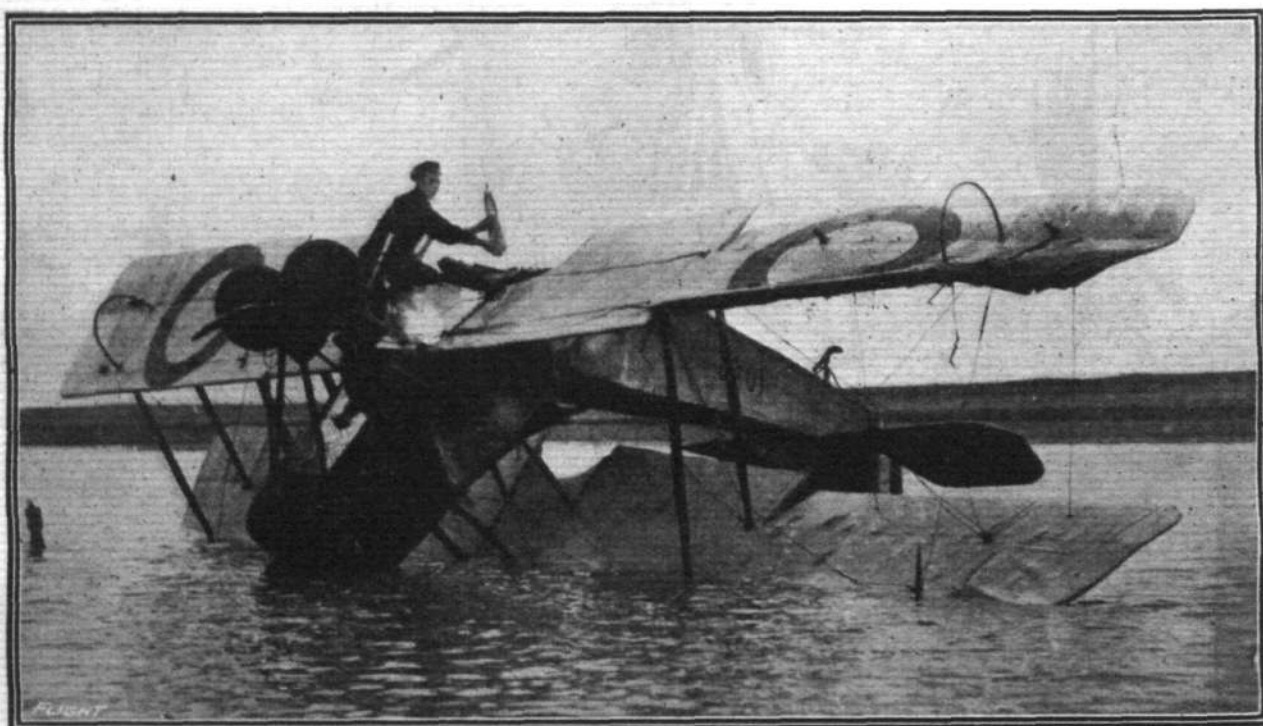
Instructors: Messrs. Ed. Baumann, Felix Ruffy, Ami Baumann, Clarence Winchester and Andre Thomsen.

Machines in use: 50 and 60 h.p. Ruffy-Baumann tractor biplanes.

Bournemouth School.

Pupils rolling last week: Messrs. Adamson, Kennedy, J. L. Barlow, Brandon, Gordinue and Pritt. Straights alone: Messrs. Smith, J. Wilson, O. Wilson, Morley, W. Mouton, G. Mouton and Morris. Half-circuits alone: Messrs. Simpson, Dobois, Meeus, Devos and W. Mouton.

Instructors: Messrs. King and Summerfield.



EUROPEAN WAR. WITH THE BRITISH FORCES IN THE MEDITERRANEAN.—The finish of a complicated "landing." A machine laden with bombs comes to grief, but luckily no one was hurt. Several bombs fell off, the remaining bombs being "retrieved," as seen in our photograph.

AIRSHIPS.

By R. P. HEARNE.

Home Defence Zeppelins.

LORD BERKELEY has made an excellent suggestion with regard to building battle Zeppelins for home defence against the enemy airships. Our ships would dispense with bombs and machine guns, and use their lifting power to support a long range gun. This would give an enormous tactical advantage to the British vessels, as by firing shells they could certainly destroy any enemy airship.

With equal or greater speed than the German Zeppelin, one of our ships could pursue a raider and by the aid of its own searchlights or those from the land stations the British Zeppelin could find a certain target for its shells. A little fleet of these ships could give far greater protection than the most elaborate system of gun defence on land.

The chief problem would be that of mounting a big gun on a Zeppelin. Many difficulties require to be overcome. For example, we must provide against recoil, but already this trouble seems to have been tackled with some success. Then again, the blast of flame from the gun leads to the risk of igniting the hydrogen which constantly leaks from the gas bags. But I do not see an insuperable difficulty in averting this danger. If only the Government would create a research and technical board to deal with Zeppelins, I feel sure we could quickly beat Germany in this branch of engineering.

Wind Problems.

I have been taken to task in rather breezy fashion by Mr. C. S. Dyer for my remarks about Zeppelins in a snowstorm. It was suggested that an airship heading into an oncoming snow squall was impeded more than a vessel over-running a similar squall. I am glad that the point has been raised, for anything connected with the wind has great interest for me, and I am ever eager to learn more about it.

However, though I do not profess to be an expert on winds, I think I detect Mr. Dyer in a pretty error. My critic says that it does not matter in the least whether the airship goes sixty miles per hour in the same or in the contrary direction of the wind, and he bases his argument on the generally accepted notion that the wind is a uniform and endless current of air. Immersed in such a current, an airship, of course, can move backward or forward, just as a man on a train running at sixty miles an hour can walk to one end or other of the train with equal facility. The trouble comes when he steps off!

The airship, if it has no motion of its own when immersed in a thirty-mile-an-hour current, moves on at thirty miles an hour in relation to the earth. But it has no speed in relation to the current of air. If it sets its engines going at thirty miles an hour it will screw its way at that speed through the air current.

Now all this is the usually accepted belief, and it is built on the academic conception that wind is a current similar to other continuous currents. Mr. Dyer would be quite right to criticise me if I said that an airship moving in a continuous air current of constant speed and direction found more difficulty in going against it than with it. A fly in a railway carriage travelling at thirty miles an hour is another classic example. The fly can move with or against the train direction with equal facility—provided the windows are closed. If a miniature snowstorm could

be produced in that carriage, the fly would get the same dusting of snow irrespective of its direction of travel.

Trains of Air.

But the wind is not a continuous or constant current, either in speed or direction. Instead of a steady and universal current of uniform speed we frequently get a most irregular series of local gusts, blows, waves, or detached volumes of air. I have coined the phrase "trains of air" to express my notion of the wind. It is as if one stood in a busy railway station through which trains of various speeds and lengths dashed in rapid succession. A local "train of air" comes upon you at thirty or forty miles an hour. In a few moments it is past, and you are in calm air. A slower gust then may come, and so the storm goes on, with calm or relatively calm periods between each burst. Very seldom, save at sea, do we find continuous air currents quite regular in speed and direction for any length of time.

Now let us assume that an airship with engine stopped is immersed in a "train of air" moving at thirty miles an hour. The airship is carried along just as a balloon would be. It remains in its "train of air" just as a floating speck of dust hovers in a railway carriage, irrespective of train speed.

Let us imagine a thirty-mile long "train of air" moving at a speed of thirty miles an hour, and with a motionless airship immersed at its centre. Now set the ship to screw forward with its own speed of thirty miles an hour. It will travel fifteen miles through the "air train" in half an hour. If we had a railway corridor train thirty miles long, with a fly in the middle corridor, this fly by its own speed of thirty miles an hour would go either to the engine or to the last carriage in half an hour's flight at this speed.

If we assume for the purpose of the argument that there is still air in front of the train, then if the fly left the train from the engine end it would have a speed of thirty plus thirty or sixty miles an hour in relation to the surrounding air. And if it dropped off the train without any speed of its own it would hit the still air at a speed of thirty miles an hour.

We can conceive an airship travelling at thirty miles an hour in a region of still air. Imagine now that a "train of air" approaches it at a speed of thirty miles an hour and carries a snow squall with it. The airship would strike this squall with an impact speed of thirty plus thirty or sixty miles an hour. This impact, I maintain, would pile hard snow on the airship with, at high levels, a dense skin of ice formed underneath.

But if the airship screwing through a region of still air at thirty miles an hour overtook an independent "train of air" moving at twenty miles an hour in the same direction, the force of impact would only be thirty minus twenty, or ten miles an hour, for the airship would be overrunning, not colliding.

I may be wrong in my theory of "trains of air" into which and from which airships are constantly moving during a voyage, but I confess that the notion of the wind being an endless train or uniform current does not satisfy me; and once we get the idea of the wind coming along in irregular gusts or local "trains" many new problems arise. All would be simple if we could only see the wind, or give different colours to the varying streams. I have an idea that birds can see the wind. Perhaps one day we too will see it.



By THE

"DREAMER."

Flying, and Future Generations.

WHEN I see those little urchins at play by the edge of the sea, I know them for natives. No teaching could instil that element of natural assurance so conspicuous in their movements, as little brown legs transport little brown bodies clad in but shirt and breeches, in and out the flotilla of boats gently rolling to the incoming tide. Surefooted as goats on the mountainside, they spring from dingy to yawl, from bow to gunwale, hardly heeding where they step.

Born of generations of sailormen, the water is their natural element. They toddle to it so soon as they can toddle anywhere, and never leave it for very long periods until they die. Buried, they lie within sound of its restless rolling, lulled in their final sleep—it must be—by the hish-sh-sh of the pebbles as they roll gently down the beach after the receding wavelets.

Water-wise from their cradles, no land-born child could ever hope to become their equals, because it is born in them. The salt of the mighty ocean is in their blood. It was in the blood of their fathers and forefathers. The health-giving breeze is their inheritance. Their first breath unconsciously quickens in them the call of the sea.

They do not have to be taught to row or to swim. So soon as they are strong enough to lift an oar, they thrust it out through the stern of a boat and wriggle round and about, in and out—true water-babies. Should one fall overboard, I verily believe he would strike out quite naturally, and regain his boat with no more trouble, and no more thought, than he would give to wading through a shallow pool at low water.

Becoming older, they help their father to sail his boat, and seem to know exactly what is required without being told; they know every sail and rope by name, ostensibly without being taught.

Nor is it only in those born to the sea that we find this natural fitness. The same thing may be noticed in other walks of life. There are those born to the horse. Children of both sexes born of generations of equestrian forefathers, take to, and can manage horses from their earliest days. They do not have to be taught to ride. Long before it has been deemed desirable by their parents that they should be instructed in the art of horsemanship, they have generally taken matters into their own hands, probably commencing operations by riding, without saddle or bridle, the donkey turned loose in the meadow. Failing all else, I have known the domestic cow to be their first mount. Ride they must—or drive.

Because these things have come to us from earliest years we accept them as the commonplace. We look on without understanding; we see without realising. Sons of horsemen always make good riders, sons of sailors excel in their father's calling—it is natural—we accept

the fact without thought, let us come a little nearer to modern times, to something not of our ancestors.

Those of my readers who remember the coming of the bicycle will recollect that to learn to ride was an achievement of which to be proud. Schools were established to teach the great art, the intricacy of balance appeared colossal, the perplexities of steering insurmountable. Suburban roads produced at eventide multitudes of heated, perspiring men running beside bicycles steering erratic courses.

To-day, a would-be cyclist just simply takes his cycle out and rides it; children learn the art, nobody knows when or where. It appears as if the knowledge were born in them, certain it is that the first the parent generally knows of the matter is to see them gliding merrily along on the mount of a friend.

And I venture to think that the time will come when flying will fall into line with these other things; when the offspring of flying men will take to the air naturally. This, of course, will take time, but time has also entered into the operations necessary to promote the natural aptitude for a nautical life in the sons of sailormen. The aeroplane of the future, also, may possibly be something altogether different to that which we know to-day. Again, we must not forget that up to a few years ago the ability of the human to fly on a heavier than air machine was thought to be impossible. The development of the petrol engine made the evolution of the power machine much easier, but had we known years ago what we know to-day, that anything will fly, given enough power, we should, I feel sure, have evolved a light steam engine which, with all its drawbacks, would have at least demonstrated that it were possible to get into the air. It was just that it was deemed impossible that caused it to remain impossible for so many years.

Look around, and you cannot fail to notice how easily men learn to pilot a machine now compared with but six years ago. Machines have improved wonderfully, of course, but the chief reason for the ease with which flying is learned is because there is no longer any doubt in the matter. Anybody can learn to fly, and in a few years flying will be looked upon as requiring little more skill than driving a car, and the generations to come, generations whose fathers and forefathers were flying men, will take to the air with as little conceit as the children of sailors take to the sea. It is in the nature of things, it must be so. All things of this description are looked upon in their initial stage as marvellous. A few years and they are commonplace. Yet a generation or two, and they almost become part of one's daily life. Aviation is going to make distance a negligible quantity, and thus is bound to bring about vast alterations in our daily lives, alterations of which I can tell nothing at this moment: I may only dream.

Germans Fear Air Raids.

WRITING from Copenhagen on April 14th the *Daily Telegraph* correspondent says that it is reported from Flensburg, Slesvig, under date April 11th, that throughout the whole Kiel Canal district there

are many anti-aircraft precautions, as the military authorities are expecting an air raid from the north or over the Little or Great Belt. About eighteen flying machines and two of the older Zeppelins guard the route from Holtenau to Brunsbuttelkoog.

AEROPLANE ARMAMENT AND THE FOUR TYPES OF MACHINES IN USE.



Our issue of March 30th, 1916, some extracts were given from an article which appeared in the *Times* of March 25th by Mons. G. Prade dealing with the latest Zeppelins. Two further articles by M. Prade have appeared in the *Times*, one, on April 7th, treating of the various uses to which aeroplanes can be put, and the selection of four principal types, while the other, in the issue of April 14th, goes into the question of the armament of aeroplanes.

M. Prade, after outlining the use of aeroplanes for regulation of artillery fire, reconnoitring and photographing enemy positions and gun emplacements, signalling the arrival of reinforcements, aerial bombardments intended to cut, or at least disorganise, the enemy's communications, chasing and counter-chasing, &c., goes on to the fundamental reasons why different types have to be employed for different purposes.

"Constructors," Mons. Prade says, "first thought of building an almost unique type of aeroplane, which would serve for all these uses. The advantages of this unification were obvious; greater facility of production, of repair, and of apprenticeship. Unfortunately it was a Utopian idea, and had to be abandoned. Just as it is impossible to have one single type of ship, and it has been found necessary to create different types for different functions, necessitating specific qualities of speed, tonnage, armament, and defence, so it has been found necessary to create different types of aeroplanes.

"Certain of the functions which I have just enumerated demand, in fact, qualities which not only differ but are opposed to each other, and practically exclude one another. Thus, the ideal apparatus for regulating artillery fire would be one capable of perfect immobility above the points to be observed. A 'chaser,' on the contrary, calls for the greatest possible speed. Now, in aviation, the lowest speed without falling is always in relation to the greatest speed—it is roughly equivalent to 50 per cent. of the maximum speed. The incompatibility of these two solutions is apparent. In the same way, a 'bomb-dropper' must above all be a weight lifter, a quality entailing considerable wing surface, and consequently low speed and a certain difficulty in manoeuvring.

"On the other hand, it was impossible to increase to infinity the types of machines, because we have neither an infinity of models nor of motors, and the qualities of an aeroplane are first of all determined by the power and weight of its motor. A compromise was therefore arrived at by the selection of four principal types of aeroplanes, which are, according to their uses—(1) scouting aeroplanes; (2) artillery observation aeroplanes; (3) bomb-droppers; (4) battleplanes. Each of these types is divided into sub-types, ranging from what may be called the minimum of utilisation to the maximum of utilisation."

Regarding the first type—the scouting aeroplane—the author points out that the trench warfare of modern times has considerably reduced the range of action necessary for a scout whose object is to examine the enemy lines first by eye and afterwards by means of photography, and that therefore no great quantity of petrol has to be carried. The principal qualities desirable in a scout are manoeuvring facility and climbing power, so as to enable them to escape from enemy chasers, as it is almost impossible to protect them by convoys of fighting aeroplanes owing to the irregularity of their missions. The equipment should include a camera, a machine gun for defensive purposes, and a wireless installation. Mons. Prade comes to the conclusion that biplanes of about 43 ft. span, and with motors of from 80 to 150 h.p., are the most suitable for this purpose. This is hardly in keeping with what we in this country have come to regard as the scouting type of aeroplane, and a machine of this description would, it appears to us, stand a poor chance of escaping from an enemy chaser, what with machine gun and wireless set, and we are rather inclined to think that a small, fast, single-seater scout (as known over here), equipped, if absolutely necessary, with a light machine gun, would be found more suitable. The wireless set would seem to be superfluous in a scout, since Mons. Prade himself says that the necessary radius of action need not be very great, and the machine, minus the wireless set and other impedimenta, would be able to bring back the information desired almost, if not quite, as quickly as the wireless message.

Of the machines used for artillery spotting Mons. Prade says that these should be able to fly slowly, and afford a free view in all directions for the observer. Also they should be able to climb to a reasonably safe altitude, and be equipped with wireless to regulate the artillery fire. With this it is possible to agree, but when it comes to drawing deductions and determining the most suitable type of machine to fulfil these conditions we are no longer in accord with

the author when he says that "use should be made of small biplanes with a wing-spread of about 30 ft., furnished with two light and powerful rotary motors." A machine of only 30 ft. span and having a motor on each wing—at least that is the inference since the object of the two engines is, presumably, to provide a good view for the observer—is apt to be somewhat unsatisfactory as regards lateral control.

Mons. Prade's remarks on the bomb-dropping machine appear to be nearer the mark. He points out that no useful purpose is served by increasing the power beyond a certain point, which occurs when the maximum radius of action has been obtained, and that when it is desired to carry large quantities of bombs it is better to distribute them among a number of machines.

The fourth type is the "battleplane," which is "the latest product of military aviation, and it is easy to understand why. In aerial warfare one first of all attempts to make use of one's own aeroplanes. After that one tries to prevent the enemy from doing the same. This gave rise to the creation of the 'chaser,' a light aeroplane, rapid, and climbing very quickly, so as to dominate the adversary—a favourable position in aerial combat. Finally came counter-chasers, whose object is to defend working aeroplanes—that is scouting planes, artillery directing planes, and bomb-droppers—against enemy chasers. These aeroplanes are of the same type as 'chasers,' simply rendered more redoubtable by their armament.

"Aeroplanes of the fighting type cannot be large, a condition which limits their artillery and its calibre. Most of them do not exceed a ton in weight. They are the only single-seated type. The pilot is at the same time the gunner. A two-seated apparatus would be preferable. The smaller the machine the better, provided it can carry a sufficient armament and is built in such a way as to permit firing in every direction."

In his second article Mons. Prade deals with the problem of arming aeroplanes. "Aeroplane armament," he says, "constitutes an entirely different and novel problem. It would appear at first sight as if only familiar engines of warfare, such as carbines, machine-guns and pom-poms could be used, and this is the case; but the question is how these weapons are to be employed. How are they to be placed in the middle of so complicated an apparatus as an aeroplane, within reach of the observer-marksman, with a field of fire intercepted, in front or in the rear, by the gigantic circumference of the revolving propeller; to the right or left, and often above, by the canvas-covered planes, the uprights, and stays, and underneath by the flooring and the landing-wheels?

"The solution of these various problems is so important that, as will be seen, it regulates not only the possible armament of the aeroplane, but the constitution of the machine itself. In pursuit of a definite purpose, and under the stress of a regular struggle for life, in encounters with other machines, the aeroplane, like an organised and living being, has gone through a process of evolution determined by recognised laws.

"The first requisite for fighting in the air, just as at sea, is to have sufficient speed to be able to overtake the adversary and compel him to fight, and also to be able, in case of need, to avoid an engagement. There are two speeds, which can be used either for overtaking or escaping from the adversary—horizontal and vertical speed.

"In regard to vertical speed, the question is further complicated by another consideration. There is not only the speed at which the machine can climb, but the maximum altitude it can reach, or the height of its 'ceiling,' to use French aerial slang. In practice ascensional speed and maximum altitude generally go hand in hand, and what we have to do is to combine them both with great horizontal speed.

"Another necessity is for the machine to be very handy, so that it can make sudden turns to escape, and can also follow such turns as may be made by the adversary. The ideal thus reached is a small but powerful machine, with not too much surface, giving good results in proportion to engine power and offering the least possible resistance to the air. In practice, these conditions are fulfilled by biplanes or monoplanes, with engines of 100 or 150 h.p., with the propeller in front, and carrying a load of not more than 200 kilos. (4 cwt.). Many attempts have been made with a view to correcting the defects inherent in battle-planes, which nowadays are all small machines, either biplanes or monoplanes, extremely light and fast, able to climb fast and high, and all having the propeller in front.

"Most armies having captured one or several of the enemy's machines, these arrangements are no longer a secret, and some of them may be mentioned. The first was contrived by the well-known airman Garros, and the Germans have adapted it to some of their Fokkers. It consists of fitting a very light single-seat mono-

plane with machine-guns so fixed as to point along the axis of the machine. The pilot, who is alone, directs the *fuselage* of his aeroplane at the enemy, and fires across his propeller. Two plans were tried for preventing the propeller from being broken by the bullets. The first consisted of stopping the machine-gun whenever the propeller came within the field of fire, but practical experience showed that frequent stopping, with propellers making 1,200 revolutions a minute, ends in putting the machine-gun out of order. Designers, therefore, contented themselves with fixing steel plates on those parts of the propeller which were liable to be struck by bullets, the steel plate serving to turn the bullet. According to a mathematical calculation of probabilities, the two propeller blades, in this part of their course, occupy about 20 out of the 360 degrees of the circle. On the average, therefore, only about one bullet out of every 18 is wasted. Another and more ingenious plan, which cannot yet be described, will enable the marksman to fire over the axis of the propeller, which is the ideal position for firing.

In the German Aviatiks of the latest pattern, one of which was captured in France, the passenger is placed in front of the pilot, and moves his machine-gun rapidly along two parallel steel bars outside the two edges of the *fuselage*. Two catches, placed in front, prevent the line of fire coming within range of the propeller, which is, of course, placed in front of the marksman. His range of fire thus extends to about 300 degrees.

The carbine, which cannot cope with the rapid fire of the machine-gun, has practically gone out of use, but some German aeroplanes have been fitted with automatic rifles, certain of which, while lighter than machine-guns, can carry a reserve of 25 cartridges, equal to that of a small machine-gun. The Germans have succeeded in using the full-sized flexible belt of 250 machine-gun cartridges. Probably, however, the English now possess, in the Lewis, the best machine-gun for aeroplane work.

If the object is to use larger calibres, that is to say guns firing a 1 in. or 1½ in. shell, the forward position of the propeller must, of course, be abandoned. The machine must be increased in size, and its speed will consequently be reduced. This is why the gun-plane is entirely different from the machine-gun plane. Not only is it larger, but it is not planned in the same way. Nowadays all armies have gun-planes, which are used for protecting or destroying airships, such as the Zeppelins, and shelling locomotives. The great difficulty, of course, has been to find guns giving a sufficient muzzle velocity (2,700 ft.) to carry out a flat trajectory fire up to a range of 6,600 ft., and also firing a shell having a fuse which is sensitive enough to explode in a balloon and, at the same time, is sufficiently resistant not to burst as soon as it leaves the gun under such terrific speed.

While most of the Allied aeroplanes try to fight the enemy while flying after him, the German machines, which do not usually fire over the propeller, and which all have the propeller placed in front, endeavour to overtake and pass the hostile machine and fire at it from behind.

The following extracts are from a further article on aerial defence of cities by Mons. Prade. This appeared in the *Times* of April 22nd:—

"Look-Out Work.

"The main question is to be able to report the enemy's coming. In this respect Paris is not so well situated as London, being nearer the German lines, from which it is less than 62 miles distant. It is easier, however, to keep an aerial look-out over Paris than London, because the latter city is too near the sea, where watch is impossible. In the protective zone, not only the eye, but the ear must be on the alert. The city to be defended must therefore have in front of it what is called a 'zone of silence,' and this cannot be obtained on a sea coast, owing to the noise of the waves. Though it is much easier to hear than to see a Zeppelin at night it might be possible on clear nights to divide the sky into imaginary compartments, to be constantly watched with telescopes, somewhat after the manner in which astronomers have divided up the work of mapping out the sky. Except in one or two cases out of about thirty incursions Zeppelins have always been reported in time in France.

"When the Zeppelin is reported the next thing is to keep it in sight, which is very difficult, to come up with it, and engage it. I have already said that, in the case of an airship sent to bombard London or Paris, the engagement may be expected to have three phases, the first of which will be an attack by anti-aircraft guns before the airship reaches its destination. At this stage the Zeppelin is comparatively low, not having yet dropped its bombs, and if the

locality at which it is reported be known its approximate course can be ascertained, its destination being also known. Searchlights from the ground and aeroplanes in the air can then be set to work upon this route. If these aeroplanes discover the monster, and can attain the same altitude, an attack with guns will be comparatively easy. The best position for the aeroplane is behind and below the Zeppelin, while flying in the same direction.

"It must be remembered that a shell can go right through a Zeppelin without setting fire to it, and also that a Zeppelin can catch fire without exploding. It is even asserted that in Zeppelins of the latest pattern the space between the ballonets and the envelope is filled with non-inflammable gas which, if the hydrogen became ignited, would extinguish it by preventing the oxygen of the outer air from reaching the hydrogen inside. It is true that the Revigny airship caught fire, but this was because several incendiary shells went through it. On the other hand, the L. 15 did not catch fire.

"All these preliminary operations should be regulated from the ground—from some landing place, to which all news of the airship's movements should be telephoned. This information should be immediately passed on to the aeroplanes overhead by means of coloured lights which, by a prearranged system of signals, will tell the pilots in what section the Zeppelin has just been seen. This search should stop as soon as the airship comes within range of the batteries, unless, of course, the airship is discovered and pursued by some of the aeroplanes, which should continue to chase it, even at the risk of coming under fire from the batteries. The lights they carry cannot but help the gunners and enable them to find the Zeppelin, as the aeroplanes follow it; but when the aeroplanes are merely looking for the enemy they can only mislead the artillery.

"Gunners and Guns.

"Firing on Zeppelins should be regulated by ordinary telemeters, enabling the calculations to be made quickly. It should take the form of screen fire at a point on the Zeppelin's course. This fire will be of no use unless lateral observations are taken by special look-out men and telephoned to the gunners. These look-outs are the men who really direct the shelling, as it is quite impossible for the gunner to tell whether the shell-burst is too short or too long, too high or too low. The estimate can only be made horizontally.

"The use of rather large calibre guns, firing shells that will reach an altitude of over 9,750 feet and scatter splinters over a very wide area, cannot be too strongly recommended. A dimension of 520 feet can be taken as the basis for calculating, in degrees, the position of a Zeppelin on the background of the sky. It must not be forgotten that, at a height of 9,750 feet, an airship of this size looks barely half the apparent diameter of the moon."

"If the Zeppelin escapes the two screen fires the chase on the return journey will, of course, take place at greater altitudes. An airship with a capacity of over 270,000 cubic feet rises about 2,600 feet after getting rid of 3,000 lbs. of bombs. This is why the Zeppelins generally come at a height of 6,500 feet and return at 9,750 feet.

"It would be advisable to provide for patrolling the air at different altitudes, so as to facilitate the search. Also very much to be recommended is the use of a few captive balloons, which, at a height of 4,900 feet, would be quite near the Zeppelin's track. These balloons, with two men in the car, should be connected by telephone with the night aerodrome from which the signals with lights are made. They might also be provided with coloured parachute rockets to indicate at what point they see the enemy. It would be very difficult to provide these captive balloons with telephone receivers on account of the singing noise set up by the steel cable."

* In this connection Mr. A. A. Rambaut, of Oxford, in a letter to the *Times* points out an error. Mr. Rambaut says that M. Prade "makes no reference to the distance of the Zeppelin in a horizontal direction. As is well known, the apparent semi-diameter of the moon varies within certain small limits, but its average value may be taken to be slightly over 15½ minutes in angular measure. Now, it is easy to show that an airship 520 ft. long, if vertically overhead at a height of 9,750 ft., would subtend an angle of more than three degrees, and would therefore appear about twelve times as large as the above paragraph would suggest.

"On the other hand, to subtend an angle equal to the semi-diameter of the moon, such an airship would have to be nearly 22 miles (21.8) away from the observer. At that distance, if flying at a height of 9,750 ft. above the ground, it would be seen at an altitude of rather less than five degrees above the horizon."



Bournemouth aerodrome. He started off again, and had proceeded about a mile, when the machine, apparently as the result of a side-slip when turning very sharply, dived to the ground. The pilot succumbed to his injuries about a quarter of an hour later.

Fatal Accident near Bournemouth.

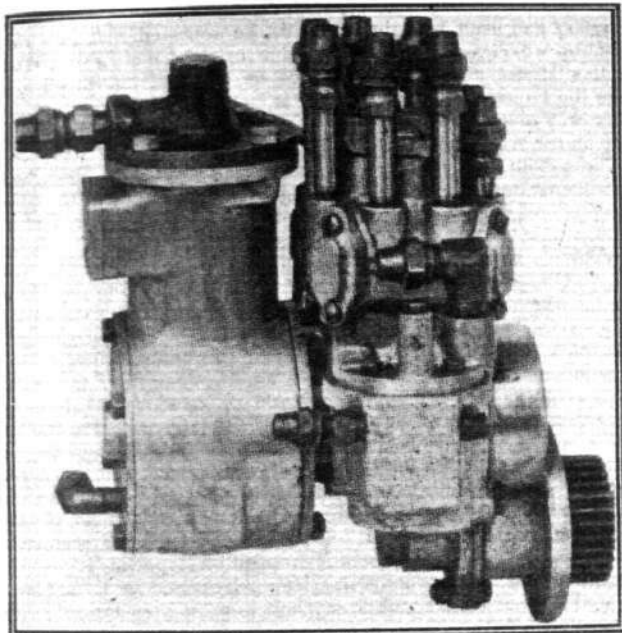
WHILE starting near Bournemouth on Monday morning, Lieut. E. W. Reddeck, R.F.C., met with a fatal accident. He had left Beaulieu early in the morning and had made a brief stop at the

THE CHRISTENSEN SELF-STARTER FOR AERO ENGINES.

It is a little curious that comparatively nothing has been done up to the present to simplify the starting of aeroplane engines, and, with few exceptions, "swinging the prop" is as much the order of the day now as in the early days. Now that high-powered and multiple engines are coming more and more into vogue, the subject is receiving more attention from designers, and in this connection interest attaches to the Christensen self-starter, which has been in use on automobiles for the past five or six years, and is now being adapted for aeroplanes by the N. A. Christensen Co., of Milwaukee, Wis., U.S.A. This self-starter, which is of the pneumatic type, is

forced downwards, a spark occurs, igniting the charge, and setting the engine in motion.

When the engine is running all the parts are out of engagement, consequently there is practically no wear. All the parts are made



The air-compressor of the Christensen self-starter for aeromotors.

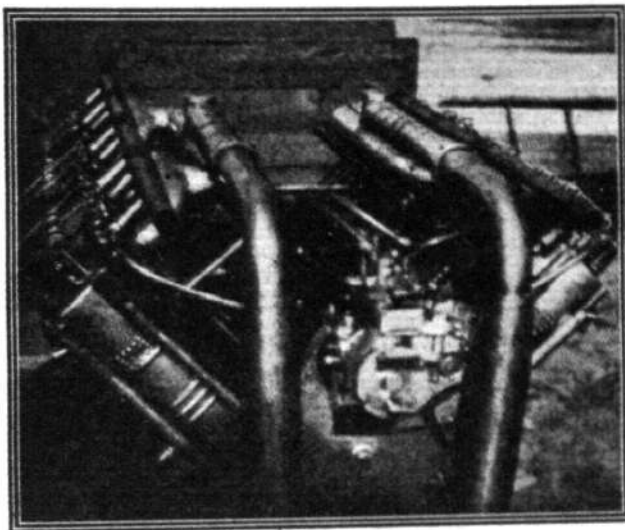
not only light, weighing complete about 40 lbs., but very simple and effective in operation, and compares very favourably with those of the electric type.

The component parts consist of a small air compressor and a distributor valve worked from the engine, a control valve, a surface carburettor, a reservoir and, of course, the necessary piping. The air compressor, which is of the single-cylinder, single-acting type, is driven from any convenient shaft of the engine—that driving the magneto being, perhaps, the most suitable. It is so coupled to its driving shaft that it can be disconnected at will, as it is not necessary for it to be running all the time. Air from this compressor is delivered to a reservoir located at some convenient part of the machine, and on its way it has to pass through the control valve, which is situated on the dash in front of the pilot. There are three movements to the control valve lever, (1) starts the compressor (when the engine is running, of course), and opens the communication through to the reservoir; (2) the compressor is put out of action, and the reservoir shut off from the rest of the system; (3) air is allowed to flow from the reservoir through the carburettor, and thence to the distributing valve, operated by the camshaft. This distributor is provided with one valve for each cylinder of the engine, and is so timed that the carburetted air is admitted under pressure, to a cylinder on its firing stroke. Thus the piston is

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"Aeroplane Design."

THE appearance in book form of the paper read by Mr. F. S. Barnwell before the Engineering Society of Glasgow University in the winter of 1914 would seem to be very opportune when, as at the present, so many branches of engineering are being drawn into the aviation industry and when consequently more and more engineers are taking an interest in aeroplane design. Although the book is not—and does not pretend to be—a complete treatise of the subject, Mr. Barnwell—who, by the way, is the designer of the Bristol Scout—has been singularly successful in incorporating in his book just enough to give a clear understanding of the general principles of aeroplane design and yet keep the mathematical aspect of it well within the grasp of any non-technical reader possessing a fairly



The Christensen self-starter fitted to an 8-cyl. Curtiss aeromotor.

of aluminium and chrome vanadium steel, heat treated and ground to a perfect fit, and the lubrication is automatic. The following results were obtained from tests carried out with a Christensen starter fitted to a Hall-Scott motor at the Sloan Manufacturing Company's plant in Plainfield, N.J. On a tank of air of 250 lbs. pressure, 28 complete starts were made without recharging the reservoir, and the last start was made with a pressure of only

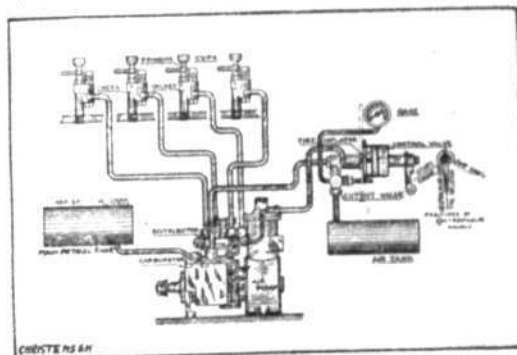


Diagram showing the general arrangement of the Christensen self-starter for aeromotors.

100 lbs. It is stated that the Sloan Company was so impressed with the demonstration that it has been decided to adopt this starter as a standard equipment.

It may be of interest to note that the inventor of this self-starter, Mr. N. A. Christensen, is also the inventor of the system of air-brakes now in use on the London Underground Electric Railways, Paris Underground and surface lines, and many other continental and American railways.

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sound knowledge of the fundamentals of mathematics and mechanics. Should anyone experience difficulty in following Mr. Barnwell's remarks on stability, they will find the chapter on this subject contributed by Mr. W. H. Sayers of great service. Written in simple, non-technical language, this explanation of inherent stability is lucid enough to be followed by the veriest tyro in aviation matters. The book is one which will be equally useful to the amateur who wishes to know something about the theory of flying and to the trained engineer who has not hitherto given any attention to this new branch of science. Moreover, the price—2s. 6d.—is within the reach of all. The publishers are Messrs. McBride, Nash and Co., and it may be obtained from "FLIGHT" Office, price 2s. 10d. post free.

THE AIR SERVICES IN PARLIAMENT.

IN the Debate on the adjournment in the House of Commons, on April 19th, Sir H. Dalziel said he wished to register his protest against the action of the Government in again postponing their promised statement as to the Air Services. They had been assured that they would have such a statement after the financial business was disposed of and before the adjournment for Easter, but all that they had got was a reply to a question that day informing them that the situation had been examined and a report presented, which recommended large changes in organisation and otherwise. It was time for members to complain of the self-complacency of the Government with regard to things generally, and particularly with regard to the Air Services, which had been so much neglected. We had been nearly two years at war, and there was still no real controlling brain at work for the benefit of these services.

Mr. Billing said he desired to allude to the Prime Minister's admission in answer to his question that afternoon, that the whole organisation of the Air Service was wrong and rotten and needed drastic reform. He thought that was almost what he had admitted. The right hon. gentleman had told them that he had requested Lord Curzon to inquire into the position of the Air Services, and that his report was so intensely unsatisfactory that drastic reforms were necessary. He thought he could assume that he had not come to the House in vain. It more or less justified his leaving the service during the war. Unless some definite and satisfactory announcement on the matter were made before the end of next week he proposed to raise this question.

In the meantime he asked the indulgence of the House to make a personal explanation. Last week posters were covered with his name. Some of them stated it one way and some the other. The following letter which his solicitors wrote to the Admiralty would explain itself:—"Sir,—The attention of our client, Mr. Noel Pemberton Billing, M.P., has been called to a statement alleged to have been made by Mr. Edgar Charles W. Middleton to three officers of the Royal Naval Air Service, that he came down to Dover to do a bit of spying for Mr. Pemberton Billing, M.P. If any such statement was made, we are instructed by Mr. Pemberton Billing to say that there is not one word of truth therein, or in the suggestion that Mr. Middleton was authorised or in any way requested by our client to go to Dover or elsewhere 'to do a bit of spying' or obtain information for him or on his behalf. We may say that on the instructions of Mr. Pemberton Billing we have to-day issued a writ against the proprietors of the *Globe* newspaper for damages for libel, contained in a placard issued yesterday containing the words 'Spying for Pemberton Billing. Airman Arrested.'"

He would like to give a brief personal explanation with respect to charges which had appeared in a London newspaper. For the past three days an attempt had been made by inaccuracy and innuendo to discredit his character, and to hold him up before the public as a man unworthy of credence and who claimed an authority which he was not entitled to exercise. He would have passed over all these allegations as mere personal abuse, except for the charges which appeared that day.

It was un-English to attempt to injure a man by insulting domestic innuendoes, which were as false as they were cruel. There appeared in this newspaper a direct challenge to his honour, a re-hash of the scurrilous allegations which were circulated throughout his constituency during his recent election. During that contest he was assailed by his opponents with a bitterness and a wealth of scandalous invention hardly to be believed. At that time a letter passed between a prominent Minister of the Crown and a leading party organiser, the concluding sentence of which was as follows:—"I am sorry to trouble you so much about Billing, but he has, undoubtedly, captured the imagination of the public. The seat is in danger, and unless we can discredit him I fear that he will be returned for East Herts." He was glad to say that the assistance which the right hon. gentleman was able to give was not successful. (Cries of "Name.") The writer of the letter was Sir John Boraston, and the receiver was Mr. Arthur James Balfour.

With reference to the night-flying machine which he designed, it was not until the last few weeks that the Admiralty had at last recognised the possibilities of this machine for fighting Zeppelins by night and had eventually decided to build to his design.

With regard to Pemberton Billing (Limited), prior to the outbreak of war for many years he had been endeavouring to foster aviation in this country at the cost of thousands of pounds. But appreciating the scarcity of pilots he thought he could serve his country better as a pilot than as a profit-making constructor. He therefore volunteered as a pilot and joined the Royal Naval Air Service and closed the factory. Later, the Admiralty decided that his factory was such that it was in the interests of the service that its facilities should be employed. It was therefore opened up and machines to his design were ordered. On deciding to enter the

House he requested the Admiralty to take over the whole business at their valuation, or failing that to continue it on a 10 per cent. basis for the duration of the war, so that he need have no pecuniary interest directly or indirectly in any aerial undertakings in this country so long as he remained a member of the House. Negotiations are now in progress.

Perhaps the most serious of the newspaper accusations affect members of the Government. He had asserted, and repeated, that Mr. Steel Maitland stated to him in his own house that if he stood as an independent candidate the Government would have nothing to do with him, but if he was prepared to wait he would in due course be found a safe seat. So far as the name of the Colonial Secretary had been brought into this, he repeated that in a conversation which took place in the room of the Chief Liberal Whip in this House and in his presence he declared his intention to enter the House in any event, and if he could not get in in any other way to fight the joint party machine as an independent candidate on the Air Service.

Throughout the constituency that he fought, and throughout Wimbledon during the last few days, hired speakers of the party machine had said, "This man was flung out of the Air Service. He is a waster. He is no good in the House, or out of it. He has never flown an aeroplane. He has never done anything. He is a liar." Under those circumstances, he desired to read to the House a letter which his late Commander-in-Chief wrote to him on leaving the Service. The letter read as follows:—"Air Department, Admiralty, December 23rd, 1915. Dear Pemberton Billing,—I am sorry indeed to receive your application to retire from the Naval Air Service, as I always considered you as one of the star turns for any air raid that might be required to be organised. Had another attack on the Zeppelin shed on Lake Constance been required, you were the man to undertake the job. In confidence, I may tell you that Mr. Churchill and Lord Fisher were very pleased with the way you organised the Lake Constance raid, and instructed me to note your name for advancement. I believe the French Government were also pleased with the bombs dropped on Zeppelin factory. If any question of your promotion arises, or any honour is suggested for your war services, I will do my best to press your claims on the authorities. With sincere regret on your decision to leave the Air Service, and with all good wishes for the future, I remain, yours very sincerely, MURRAY F. SUTER."

Mr. Steel Maitland said that he did not wish to take up the time of the House for more than a very few minutes. The hon. member stated that in a conversation with him at his house he undertook, if Mr. Billing waited, to find him a safe and comfortable seat. The hon. member met him at his (Mr. Maitland's) house and informed him on that occasion that he did not wish to attack the Admiralty or the Air Service. But he absolutely denied categorically that he ever either undertook or promised or gave him any expectation whatever of finding him a safe and comfortable seat if he did not attack the Government. He was afraid that he could not put it more plainly than he had done. Mr. Steel Maitland, after reading a passage from a speech by Mr. Billing in which that gentleman had referred to a conversation with Mr. Bonar Law, said the Secretary of State for the Colonies absolutely adhered to his denial of the utterances attributed to him in the room of the Chief Unionist Whip, which he supposed must have been meant when the expression Chief Liberal Whip was used. He had the Secretary of State's authority to state that before making that denial he refreshed his memory by consulting the Chief Unionist Whip as to what exactly occurred.

Mr. Gulland said the hon. member was certainly not correct in his reference to the office of the Chief Liberal Whip. He had not the pleasure of seeing the hon. member till the day he took his seat in the House.

Material for Zeppelins.

IN the House of Commons, on the 19th, Mr. Bennett-Goldney asked the Foreign Secretary whether he had official information to the effect that the warp and woof of all or nearly all the textile material used by Germany in the manufacture of all or nearly all the Zeppelins since the outbreak of the war was made in our own factories; if so, when information of this trade first reached the British authorities; and if effective steps had been taken to put a stop to it.

Lord R. Cecil replied that he had no information, but would be glad to receive any facts.

Defence Against Raids.

MR. JOYNSON-HICKS asked whether the Under-Secretary for War had received an urgent request from a town on the South-East coast for two aeroplanes for defence against raiders, and whether the mayor of such town had offered to pay for such machines.

Mr. Tennant replied that the Mayor of Ramsgate had asked that

two aeroplanes should be allowed for the protection of the town. The provision of such aeroplanes did not depend upon the willingness of the Mayor to pay for either the cost of the machines or the cost of providing the personnel. It depended upon considerations which it was obviously undesirable to refer to in the House or in any public place. But the hon. gentleman could rest assured that every possible step was being taken to protect the South-East coast.

Pilots Killed when Flying at Night.

MR. BILLING asked the Under-Secretary for War as to the number of air pilots killed or seriously injured during the recent Zeppelin raids; whether he had satisfied himself that these casualties were not due to the employment of machines unsuitable for night flying and to the effects of inadequately lighted landing-places; and could he say why losses in the air were not as fully and promptly recorded as losses in the field.

Mr. Tennant replied that since January 1st four pilots had been killed or had died of injuries, and one was badly injured and had since recovered. The aeroplanes used by these officers were all eminently suited for night flying, and in no cases were the accidents due to inadequately lighted landing-places. The same procedure was followed in reporting casualties at home as in publishing those which occurred abroad.

Mr. Billing further asked if the right hon. gentleman wished him to supply further evidence that these accidents happened owing to unsuitably lighted aerodromes?

Mr. Tennant: "No, sir; I do not wish the hon. gentleman to do anything of the kind. My information is that they have occurred through other causes than inadequately lighted landing-places."

Lights at Aerodromes.

MR. FENWICK asked whether any complaints had reached the War Office from residents in the neighbourhood of aerodromes to the effect that the lights acted as a guide to the enemy when flying over the neighbourhood, and that only recently very serious disturbance was caused by the use of the lights; and could he see his way to order their removal from places where there is a considerable amount of residential property?

Mr. Tennant stated that Mr. Fenwick had brought him a complaint in the sense that he mentioned; but he pointed out that landing-places were important, and room must be found for them somewhere. Of course it was desirable they should be as remote as possible from thickly-populated parts of the United Kingdom, and so far as he was aware that was the case.

Mr. Fenwick also asked if, when a raid was expected, the population should be notified, in order that they may clear out of their homes until the danger is past?

Mr. Tennant: That is a totally different question, but it is invariably done.

The Committee of Inquiry.

MR. BILLING asked the Prime Minister whether he was aware that the charges of inefficiency and intrigue and also the allegations concerning the deaths, losses, and injuries among our flying men made by the member for East Herts applied equally to the Royal Naval Air Service and the Royal Flying Corps; whether he would now give an assurance that the terms of reference to the committee the Government had promised to appoint will be so framed as to include both branches of the air service; and would the committee be given such powers as to enable them to make effective recommendations?

The Prime Minister replied that he would consult with the First Lord of the Admiralty on the subject.

Reorganisation of the Air Services.

MR. BILLING asked the Prime Minister (1) whether, in view of recent statements, he could say if the Government have any approximate figures as to the number of Zeppelins and other enemy aircraft built or building; whether the localities of the Zeppelin and enemy aircraft factories and their principal bases are known; whether any considered offensive policy for the defence of the country by attacking these factories and bases has yet been determined upon; (2) whether the public speeches of Lord Montagu have been brought to his notice; whether, before the House adjourns for the Easter Recess he could make any statement which would reassure the public that the resignations of Lord Derby and Lord Montagu have been taken by the Government as exposing the futility of the Joint Air War Committee, and the necessity for the immediate appointment of a body which shall have real executive power; and (3) whether the resignations of the civilian members of the Joint Air War Committee have resulted in the cessation of the meetings of the Committee; and, if so, could he give any reason why the expert representatives of the two Services should not continue their deliberations?

Mr. Bennett-Goldney asked the Prime Minister (1) whether his attention had been called, either by Lord Derby or Lord Montagu, to the elements which have done so much to mar the efficiency not

only of the Committee known as the Air Committee, but of the Air Service itself; whether he was aware that friction also still exists between the two Services themselves and between officers in high positions in the same Service; if he would take steps to put a stop to these quarrels; (2) if he could suggest any idea of the date when he will give the promised day for the discussion on our Air Services; whether he could hold out any hope that the Government intends so to co-ordinate the present system of control that, while the Navy and the Army shall each retain the necessary power over the actions of their own units, there shall be one single responsible chief of the Air Services, presided over by an advisory committee consisting of men with unquestioned knowledge and experience in actual flying as now practised as well as in aircraft construction and organisation; and (3) if he could inform the House whether the Committee from which Lord Derby and Lord Montagu resigned will be re-constituted with the fuller powers recommended by these noble lords, and in such a manner that its chairman or president shall become the Minister responsible to this House for the efficient administration and supply of our Air Services?

The Prime Minister, in replying, practically ignored the questions, confining himself to the statement that Lord Curzon, at his request, had carefully examined the whole of the aircraft situation, and as a result of that examination had presented a report which, without disclosing its precise contents, he might say recommended large changes in organisation. It was under the consideration of the Cabinet, and he could not say at the moment the final decision at which they would arrive.

Anti-Aircraft Gunnery.

MR. BILLING asked whether, in view of the difficulty when anti-aircraft guns were firing simultaneously at an object of the individual gunners spotting their shots, the War Office would consider the advisability of the introduction of distinctive coloured bursts, and thus enable each gun to estimate and correct the range.

Mr. Tennant said this suggestion was one which had frequently been made, and had been the subject of enormous experiments in our own and foreign armies. It had, however, been found to be impracticable, and, so far as was known, it had never been adopted in any country.

The R.A.F. and Selection of Machines.

MR. BENNETT-GOLDNEY asked the Under-Secretary of State for War whether his attention has been called to the dissatisfaction existing amongst experienced and practical flying men with the methods still dominating the Royal Aircraft Factory; if he is aware that, while it is admitted that the O'Gorman régime produced in pre-war days an excellent flying machine, the machines which have been lately favoured by the Royal Aircraft Factory are by no means best obtainable for war purposes; and if he will now place this factory and the whole question of aircraft supply under the Ministry of Munitions?

Mr. Tennant replied that the Royal Aircraft Factory was not responsible for the selection of the types of aeroplanes to be used by the Royal Flying Corps. He did not, therefore, quite understand the first two parts of the question. As the statements made in the first two parts of the question were not in his opinion correct, the last part of the question did not, he thought, arise.

Local Anti-Aircraft Corps.

MR. WING on the 18th inst. asked the Under-Secretary for War if he could offer any encouragement to municipalities that were willing to organise their own citizens in self-defence against raids.

Mr. Tennant stated that the municipalities could best assist by undertaking steps to preserve order and ensuring the observation of any precautionary measures ordered by the military authorities. The actual work of suppressing air raids was one which could only be satisfactorily undertaken by His Majesty's forces.

Bomb-Proof Police Helmets.

MR. HERBERT SAMUEL, replying to Mr. Hodge, said that if any evidence could be produced that a steel helmet was an effective protection against a bomb dropped from a Zeppelin, he should be happy to consider the suggestion of furnishing them to the police on duty on the occasion of raids.

Railway Signals as Zeppelin Guides.

MR. RUNCIMAN, replying to Mr. P. A. Harris, said experience gained by our aviators had shown that railway signals were not visible to aircraft at a greater height than 3,000 ft. In the case where many railway lights were together arrangements had been made for shading in order to render them useless as a guide to enemy aircraft.

Rewards for Naval Aviators.

DR. MACNAMARA, in Parliament on April 17th, announced an extension of rewards by bounty money to R.N.A.S. aviators when they assisted in sinking enemy vessels. This would be retrospective.

FLYING AT HENDON.

IT was clearly evident that the season for flying at Hendon had opened in earnest during the Easter holidays, and, judging from the crowds that visited the aerodrome on all four days, from Friday to Monday, that there is a considerable amount of interest in aviation which it catered for—as Mr. Claude Grahame-White assured me it will be—will secure for this popular aerodrome the success it enjoyed in the days of old. Whether it will be possible to hold race meetings as before is as yet impossible to say, but even if racing is out of the question there is still much to attract the visitor, for in addition to exhibition and passenger flights—and the latter are extremely popular now—machines of various types and the testing of new machines are often in evidence.

On Good Friday the weather was ideal, and with the early arrival of a goodly crowd of visitors flying also commenced early. Claude Grahame-White was one of the first out, testing a new Henry Farman type biplane, fitted with an 80 h.p. Gnome, which had just been completed in the G.-W. works. This machine is a three-seater, and has been designed mainly for passenger work. In the hands of its pioneer pilot it proved itself a first-class machine eminently suitable for the work required of it, which it began in earnest during the afternoon, piloted in turn by C. Pashley and M. Osipenko. Both these pilots, in addition to H. C. Biard, B. F. Hale, and J. S. B. Winter, were also very busy all the afternoon, with and without passengers on the 60 h.p. G.-W. school 'buses. The feature of the day, however, was the flying—literally—visit of the Handley Page biplane, *alias* "flying elephant," but a vastly different class of machine to the famous Brooklands "Elephantoplane" of pre-war days. It was, indeed, a strange and wonderful sight to see this machine come gliding majestically along, with scarcely a sound from its two engines of goodness only knows what h.p. each, and alight in the aerodrome at certainly not more than 20 m.p.h. An L. and P. biplane passed close by at the same time, and afforded an opportunity for some interesting comparisons. After the "flying elephant" came to rest, a trap-door in the body opened, and our old friend C. B. Prodder was lowered down on to *terra firma*, and then his mount was replenished with petrol—a process which made one cease to wonder why we are told not "to use a motor car for pleasure" when one saw so much fuel put into one machine. The interval for refreshments—for the machine—being over Prodder took it up and made a

couple of circuits (but did not loop perhaps because there was not enough air space) and a little later on he took the monster back to its den. In the meanwhile other flying was in progress, in spite of the fact that there was not much room left in the aerodrome. W. G. Smiles and G. V. Almer were out on 45 h.p. L. and P. biplanes, J. L. Hall stunted around on his 45 h.p. Caudron, and Sydney Pickles spiralled and banked high up on a Curtiss. In the evening some school work was got through.

On Saturday the weather failed to maintain its neutrality, and blew in turns from 15 to 35 m.p.h., but in spite of this there was plenty of flying. Claude Grahame-White once more put up some fine exhibitions on the new 80 h.p. G.-W. 'bus, at one time taking up the well-known one-time racing motorist, Charles Jarrot. Messrs. Biard, Hale, Winter, Osipenko and Pashley also made numerous flights on the 60 h.p. school 'bus, the two latter pilots also taking up passengers on the 80 h.p. three-seater 'bus. A very fine altitude flight was put up by two R.N.A.S. pilots on a Curtiss biplane which remained aloft for about an hour and a half reaching an altitude of over 5,000 ft. On several occasions the machine disappeared from view amongst the clouds, and during the descent many graceful right and left hand spirals were made. Whilst this flight was in progress, Harry Hawker came over from Brooklands with a passenger on a Sopwith Bullet, giving us a very fine display before landing.

On Sunday and Monday the weather was again hostile, but failed miserably in its attempt to stop flying. The pilots out on the Sunday were the G.-W. stud on the 80 h.p. and 60 h.p. 'buses—Claude Grahame-White gave further exhibitions on the "80"—and W. T. Warren on a 45 h.p. L. and P. biplane. On Easter Monday about 5,000 people visited the aerodrome, and some very good flying took place. Passenger flights were very much in evidence, the charge being reduced to £1 1s. for the occasion. Most of the passengers were taken up on the new 80 h.p. three-seater by Claude Grahame-White, M. Osipenko, and C. Pashley, and the remainder by the other G.-W. pilots on the 60 h.p. 'buses. Later in the afternoon the wind dropped somewhat, and Sydney Pickles came out and gave demonstrations of looping on a Curtiss tractor. He gave two demonstrations, executing three loops in one and five in the other, in addition to numerous tail slides. There was also a B.E. up at about 1,000 ft. banking and spiralling for nearly an hour.

PERSONALS.

UNDER the above heading will be published weekly particulars of a personal character relating to those who have fallen or have been wounded in the country's service, announcements of marriages and other items concerning members of the Flying Services and others well known in the world of aviation. We shall be pleased to receive for publication properly authenticated particulars suitable for this column.

Casualties.

Lieutenant-Colonel DONALD SWAIN LEWIS, D.S.O., R.E. and R.F.C., whose death is officially announced, was killed while flying on April 10th, aged 30 years. He was the youngest son of Captain E. Lewis, of Guildford, and received his first appointment in the Royal Engineers in December, 1904. In December, 1913, he was gazetted to the Royal Flying Corps, and was promoted Captain in October, 1914. He became Squadron-Commander in April, 1915, was mentioned in despatches in October, 1914, and on January 1st, 1915, was awarded the D.S.O. "for valuable information repeatedly furnished to the Royal Artillery in regard to the position of the enemy's guns. His direction of our artillery fire, whilst flying, has constantly led to direct hits on the enemy's batteries and the silencing of their guns." Lieutenant-Colonel Lewis was married.

Captain WALTER GERARD PALMER, Indian Army, attached R.F.C., killed on March 5th, was the second son of the late C. E. Palmer, of the Military Accounts Department, Government of India, and of Mrs. Palmer, of Instow. Born in 1888, he was educated at Tonbridge School and Sandhurst, passing out with honours. He joined the Connaught Rangers in March, 1903, and was gazetted to the Indian Army in March, 1904, being promoted captain in 1912. He was quartermaster and adjutant of his regiment, and graduated from the Staff College, Quetta, in January last. In June he joined the Royal Flying Corps as an observer, and was mentioned in despatches for June and July, 1915. He afterwards obtained his pilot's certificate. He was one of five brothers, all of whom held commissions in the Navy and Army before the outbreak of war.

Second Lieutenant NIGEL DENNISTON SCOTT, Queen's (Royal West Surrey Regiment), attached R.F.C., who was killed while flying near Thetford, on April 19th, was the son of the late G. D. Scott and of Mrs. Scott, of St. Quintin Avenue, London. He was 24 years old, and received his commission last June.

Wounded.

Lieutenant COL. WILLIAM ERIC COLE-HAMILTON, Royal Scots and R.F.C., wounded, is a son of the late Captain William A. T. Cole-Hamilton, Royal Irish Fusiliers, and is a kinsman of the Earl of Enniskillen. Born in 1894, he joined his regiment in January, 1914, and got his promotion in the following October. Lieutenant Cole-Hamilton has been in the Royal Flying Corps since the beginning of this year.

Married and to be Married.

Captain STEELE HUTCHESON, 3rd Brahmins and R.F.C., son of Colonel G. Hutcheson, M.D., late I.M.S., Brunswick Place, Hove, was—at St. Martin's-in-the-Fields Church, on April 15th—married to ESTHER, eldest daughter of ROBERT MANNERS DOWNIE, Cornbrook, Knutsford, Cheshire.

At St. Andrew's, Ashley Place, on April 19th, Lieut. GEOFFREY DENZIL PIDGEON, R.F.C., only son of Mr. and Mrs. W. R. Pidgeon, of Lynsted Lodge, St. Edmund's Terrace, Regent's Park, to MURIEL, elder daughter of Mr. and Mrs. ARTHUR HICKS, of 7, Evelyn Mansions, Westminster.

The engagement is announced between Lieutenant-Commander PHILIP SHEPHERD, R.N. and R.N.A.S., son of the late Mr. George Shepherd, of The Poplars, Bishopsthorpe, York, and Miss JESSIE ANNE CAMPBELL, only daughter of the late Mr. Donald Campbell, Kalmata, Connel, Argyll, and niece of Mr. Alexander Campbell, St. Brannocks, Eastbourne, and Shanghai, China.

Items.

The King has authorised Flight-Commander Lord EDWARD GROSVENOR, R.N.A.S., to wear the decoration of Officer of the Order of St. Maurice and St. Lazarus, which has been conferred upon him by the King of Italy in recognition of valuable services rendered.

The will of the late Lieut. BURNET GEORGE JAMES, R.F.A., attached Royal Flying Corps, tobacco manufacturer, killed on September 26th whilst on an aerial reconnaissance, elder son of Sir Edward James, has been proved at £11,231.

AIRCRAFT WORK AT THE FRONT.

OFFICIAL INFORMATION.

British.

General Headquarters, April 17th.

"Yesterday there was considerable aerial activity. One of our machines is missing."

War Office, April 20th.

"*Mesopotamia.*—Aeroplane reconnaissance after the enemy's counter-attack on the night of April 17th-18th discloses the fact that a large number of Turkish ambulances were busy all day removing their casualties."

War Office, April 21st.

"*Mesopotamia.*—The 18th was a stormy day and has made air-craft reconnaissance very difficult."

War Office, April 24th.

"*Egypt.*—On April 23rd there was fighting in the Katia district. Aerial reconnaissance indicated that hostile parties, strength from 200 to 500, had been assembling in the desert, and were in the neighbourhood of Duweidar (15 miles from the Canal), and a strong attack by about 500 of the enemy was made at 5 a.m. on the post held by us at that place. The attack was beaten off after reinforcements had been brought up, and the enemy withdrew, leaving 30 prisoners in our hands. Their known casualties amounted to 40 killed. The enemy was harassed during his retreat by a column of Australian troops acting in concert with aeroplanes, and suffered heavy casualties both from the fire of the troops and from bombs and machine-gun fire from the aeroplanes."

General Headquarters, April 24th.

"A hostile aeroplane was brought down by anti-aircraft gunfire near Ploegsteert. Pilot and observer killed. One of our machines is missing."

General Headquarters, April 25th.

"Yesterday there was considerable aerial activity. Twenty-nine combats took place. One of our reconnaissances was persistently attacked. All the attacks were driven off, and two hostile machines were seen to fall to the ground in the German lines. All our machines returned safely."

Admiralty, April 26th.

"On the morning of the 23rd inst., in spite of most inclement weather, a bombing attack was carried out by naval aeroplanes upon the enemy aerodrome at Mariakerke. The machines were heavily fired upon, but succeeded in returning safely. As far as could be observed, good results were obtained."

"One of our fighting machines attacked an enemy aeroplane and drove it down. The hostile machine when last seen was close to the ground and out of control."

"On the morning of the 24th inst. a further attack was carried out on the same objective in co-operation with our Belgian Allies, and a large number of bombs were dropped. Heavy fire was encountered by all machines, but there were no British casualties. The results obtained appear to have been very good."

"During the course of the same day (24th inst.) a British aeroplane attacked an enemy seaplane about five miles off Zeebrugge. The enemy pilot was killed, and the machine dropped, the enemy observer falling out while the machine was still at a height of 3,000 ft. The hostile seaplane crashed into the sea and sank."

"During the operations against the German Battle Cruiser Squadron, which appeared off the East Coast on the morning of the 25th inst., two Zeppelins were pursued by Naval land machines over 60 miles out to sea. Bombs and darts were dropped, but apparently without serious effect."

"An aeroplane and a seaplane attacked the German ships off Lowestoft, dropping heavy bombs."

"Four enemy submarines were also attacked by bombs."

"One seaplane came under heavy fire from the hostile fleet, but the pilot, although seriously wounded, succeeded in bringing his machine safely back to land."

"It is regretted that one pilot is reported missing. He ascended during the course of the Zeppelin raid earlier in the morning and appears from reports to have attacked a Zeppelin off Lowestoft at about 1.5 a.m. He has not been heard of since."

French.

Paris, April 17th. Afternoon.

"In the night of Sunday-Monday one of our air squadrons, composed of nine aeroplanes, despite a thick mist, carried out an important bombing operation on the Conflans-Pagny-Arnville-Rombach region. The following projectiles were thrown: 12 shells on the Conflans railway station, 16 shells on the Rombach factories, 8 shells on the Arnville railway station, and 11 shells on the railway lines from Pagny and Ars-sur-Meurthe."

"In the night of Saturday-Sunday one of our armed aeroplanes attacked in the North Sea from an altitude of 100 metres an enemy ship, upon which it fired 16 shells, most of which took effect."

Paris, April 17th. Evening.

"During the night of the 16th our bombarding aircraft dropped twenty-two bombs on the stations at Nantillois and Briailles, fifteen bombs on Etain and on the bivouacs in the forest of Spincourt, and eight bombs on the cantonments of Vieville and Thilloi (north-west of Vigneulles)."

Paris, April 18th. Afternoon.

"On the night of the 17th enemy aeroplanes threw seven bombs, including an incendiary bomb, on Belfort. Three persons are reported killed and six wounded. The material damage is unimportant."

Paris, April 22nd. Evening.

"One of our bombardment squadrons threw twenty bombs into the enemy camps near Azannes and Villers les Mangiennes (north-east of Verdun)."

"*Eastern Army.*—In reply to an enemy air raid on villages on the Greek frontier one of our aeroplanes dropped four bombs on the town of Sofia."

Paris, April 24th. Afternoon.

"In Belgium yesterday and last night our air squadrons twice bombarded the station of Wyfwege, east of the forest of Houthulst. Thirty and eighteen heavy calibre bombs were dropped on the station buildings during the two raids, and many of the projectiles struck the objects aimed at. All the machines returned safely."

Paris, April 24th. Evening.

"During the night of April 23rd-24th our air squadrons carried out several bombardment operations. Twenty-one shells and eight incendiary bombs were dropped on the station of Longuyon, five shells on the station of Stenay, twelve shells on bivouacs to the east of Dun, and thirty-two shells on bivouacs in the Montfaucon region and on the station of Nantillois."

Paris, April 25th. Afternoon.

"A German aeroplane dropped six bombs on Dunkirk this morning. A woman was killed and three men were wounded. The material damage is insignificant."

Paris, April 25th. Evening.

"Near Vauquois (Argonne) an enemy aeroplane tried to descend in its lines, but was destroyed by our guns. In the region of Verdun, one of our chasing aeroplanes fought a German machine, which fell on Pepper Hill, 50 yards from our trenches. A third enemy machine was brought down by one of our pilots in the Bois des Forges. Finally, a Fokker, riddled by machine-gun fire at point-blank range, fell vertically near Hattonchatel."

"On Monday night one of our airships dropped ten 6 in. and six 8½ in. bombs on Conflans Station (near the frontier)."

Russian.

Petrograd, April 17th.

"The enemy is using aeroplanes bearing our distinctive circles on the wings."

Petrograd, April 19th.

"One of our submarines, although attacked by an enemy aeroplane, succeeded in sinking a steamer and a sailing ship near the entrance to the Bosphorus. She was heavily fired upon by enemy batteries."

Petrograd, April 22nd.

"In Galicia hostile aeroplanes made a raid on Tarnopol, where some bombs were thrown. South of Nowo Olexinetz we found a German aeroplane which had been destroyed by fire. It apparently belonged to the squadron which made the raid on Tarnopol."

Petrograd, April 23rd.

"Enemy aeroplanes flew over the Dvinsk region."

Petrograd, April 24th.

"Enemy aeroplanes dropped several bombs on Dvinsk. A Russian aeroplane of the Mourometz type dropped thirteen bombs, each weighing 40 lbs., on the station of Doudsevas, south-east of Friedrichstadt. On the rest of the front there were exchanges of artillery fire."

Petrograd, April 25th.

"Our aviators threw 36 bombs on important points behind the enemy's front, particularly on the railway station of Jelovka, west of Illukst."

"Enemy aeroplanes dropped bombs in the region of Molodetchno."

Italian.

Rome, April 18th.

"Yesterday one of our seaplanes and three French seaplanes, escorted by our torpedo-boats, effectively bombarded important military positions near Trieste and returned safely in spite of violent enemy fire. Four Austrian seaplanes, which endeavoured to attack our torpedo-boat escort while they were returning, were counter-attacked by three Italian aeroplanes and put to flight."

"During the night enemy aircraft approached Venice, but were unable to carry out their raid owing to the sustained fire of our anti-aircraft batteries. One of them, a seaplane, was obliged to descend at sea and was captured by us, the naval officer and the pilot on board being made prisoners."

Rome, April 20th.

"An enemy aeroplane dropped three bombs on Bassano, but without doing any damage to life or property."

Rome, April 21st.

"Yesterday afternoon a flotilla of Caproni aeroplanes bombarded near Trieste a hydroplane station, upon which 60 bombs were dropped, with obviously very successful results. The aeroplanes, which were fired upon without effect by the enemy's batteries, returned safely."

German.

Berlin, April 17th.

"In the region of Pervyse (Flanders) an enemy aeroplane was brought down by our anti-aircraft close behind the Belgian lines, and was destroyed by our artillery fire."

"First Lieutenant Berthold brought down north-west of Péronne his fifth enemy plane, an English biplane. The pilot is dead, the observer seriously injured."

Berlin, April 21st.

"An enemy aeroplane fell down during the fighting at Fumin Wood, south-west of Vaux."

"A German air squadron liberally pelted with bombs the railway yards at Tarnopol."

"German aviators attacked places in the Vardar valley and to the west occupied by French troops."

Berlin, April 23rd.

"On April 22nd a squadron of ten German aeroplanes attacked the Russian air station at Papenholm, on the Island of Oesel, at the entrance to the Gulf of Riga, and dropped forty-five bombs. Very good results were observed. A Russian aeroplane was compelled to land. All the German aeroplanes returned safely in spite of a most violent fire from the Russian anti-aircraft guns."

Berlin, April 24th.

"A British biplane was brought down in an aerial fight east of Arras. The officers occupying the machine were captured."

Berlin, April 25th.

"Our aviators freely bombarded numerous enemy shelters and supply stations."

"An enemy aeroplane was brought down by our anti-aircraft

fire near Tahure, and was destroyed. Another machine was brought down east of the Meuse. This somersaulted to earth."

"A German aeroplane squadron attacked the railway and warehouse establishments of Molodetchno. Good results were obtained."

Austrian.

Vienna, April 21st.

"Yesterday afternoon seven Italian aeroplanes dropped 25 bombs on Trieste. Nine civilians, including five children, were killed and five injured."

Bulgarian.

Sofia, April 22nd.

"At eight o'clock yesterday morning an enemy aeroplane coming from the south-east dropped two bombs on one of the suburbs of Sofia from a considerable height. One bomb fell on a school building and another on a small dwelling-house. The damage caused was insignificant, and there was no loss of life. The aeroplane also dropped several pamphlets announcing the fall of Erzerum and Trebizond. During its return flight the aeroplane flew over the Vitosha Mountain."

Turkish.

Constantinople, April 18th.

"On April 14th an enemy aeroplane coming from the direction of Enos flew over Adrianople, dropping two bombs without effect."

Constantinople, April 19th.

"Syrian Coast.—A seaplane which ascended from a ship off Gaza was pursued by machine gunfire from two of our aeroplanes, which also dropped bombs on the hostile ship."

Constantinople, April 20th.

"The position of the enemy invested at Kut-el-Amara is becoming very critical. The enemy commander, in order to avoid food difficulties, recently made the population evacuate the town. He is expecting aeroplanes to drop small bags of flour."

Constantinople, April 22nd.

"Enemy aeroplanes flew over Phocæa, a suburb of Smyrna, and Cordelia, where they threw some bombs, without effect."

"On April 20th one of our aeroplanes carried out a flight of 300 kiloms. over the desert to El Kantara, on the Suez Canal, in three hours, and there successfully bombarded the enemy troops and the camp with bombs. It returned undamaged."

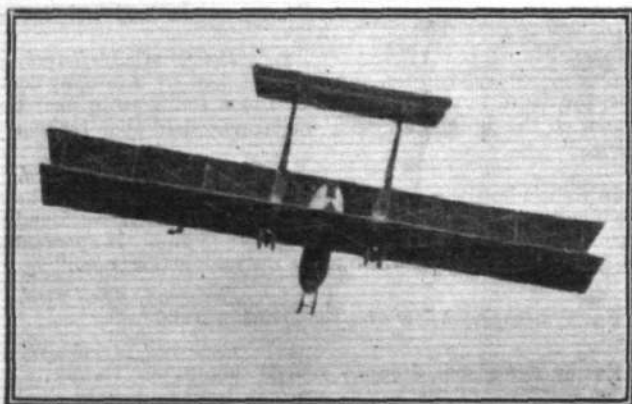
Constantinople, April 23rd.

"On the night of the 6th one of our seaplanes attacked Imbros and Tenedos and dropped bombs on the enemy's establishments, the harbour of Tenedos, and the camp there."

From Other Sources.

The *Daily Telegraph* correspondent in Paris writing on April 17th says:—

"Constant Duclos, of the French Marines, is a specialist in a particular kind of aviation; his favourite sport is parachuting."



THE 300 H.P. CAPRONI BIPLANE IN FLIGHT.—These machines, which have been frequently mentioned in the reports of Italian aerial war work, are fitted with three motors of 100 h.p. each. One of these is mounted in the central nacelle, and drives a propeller, while the other two are placed some distance out on the lower plane, each driving a tractor screw. From each of these engines a structure resembling in shape and construction an ordinary fuselage runs back to form a support for the tail planes, serving at the same time to streamline the engines. In the nose of the central nacelle are seats for three, a pilot and two gunners. For long-distance bombing raids the Capronis have proved particularly suitable on account of their good weight-carrying capacity.

Before the war a new parachute was tried at the military aviation ground. It was the ancient pattern of parachute, but with a new appliance ensuring with absolute certainty that the machine would open out in a specified time. After the descent had begun the apparatus was repeatedly tested with sandbags in lieu of passengers. Duclos, watching the machine, became so much interested that he insisted upon, and eventually obtained permission to take the place of the sandbags. Thus he tested the machine himself successfully, and on alighting safely on the ground said the experience was one of the most pleasant he had ever known. At the beginning of the war Duclos fought on the Yser and at Dixmude. After that he specialised once more in parachuting, and so far has done nineteen of these descents along the front from Flanders to Alsace. His latest feat is a descent from a captive balloon, which at the front is known as a 'sausage.' An extraordinary accident happened. An aeroplane cut the cable holding the sausage, and the latter, set free, began drifting in a southerly breeze towards the enemy's lines. From the trenches the soldiers suddenly saw the observer in the sausage throw himself out, as they thought. For several seconds the man fell, then a parachute opened, and Duclos landed peacefully and quite cheerfully in the French lines, while the sausage wandered away, and eventually fell somewhere on the enemy's ground."

An Exchange message from Athens on April 17th says:—

"A report from Salonica states that the bombs dropped by a British airman on the military establishments of Adrianople did serious damage. In the air raid on Constantinople it is confirmed that two bombs burst in the War Ministry and another in the powder factory of Makrikeui, which blew up. There were numerous victims."

The *Daily Mail* correspondent at Salonica, writing on April 16th, says:—

"At 4 a.m. to-day squadrons of French airmen bombarded German military stores at Strumnitza Station (65 miles north of Salonica), causing fires and explosions. Towards noon other squadrons flew over German encampments at Bogdantzi, north of Bogoroditza, and destroyed a great part of them. There has been an almost complete calm on the front. On the right bank of the

Vardar there has been some rifle firing against Bulgarian patrols and some artillery fire against Germans on the left bank, but there have been no infantry engagements. A great impression has been made here by the news of the bombardment of the station and military trains at Adrianople and of the barracks and ammunition factories on the Bosphorus."

The *Daily Mail* correspondent at Athens, writing on April 16th, says:—

"The expectation of the Athenian Press of a German offensive in Macedonia seems unlikely to be fulfilled. However, I learn from Salonica on the best authority that the German air activity there is very marked indeed. The Germans recently imported a number of very small machines of remarkable speed, stated by observers to be 110 miles an hour, which generally out-distance the Allied aircraft. These machines fly low, examining the Allies' lines, often not bothering to drop bombs and trusting to their speed to save them if attacked."

The Saint Omer correspondent of the *Petit Journal* writes that recently a Fokker aeroplane was struck in a commune of Saint Omer by French anti-aircraft guns, and forced to descend on the bank of a river. A boy, aged fourteen, named Lefort, who happened to be working near, was suddenly confronted by the German pilot, who without any excuse fired at him, two bullets striking his left arm. Several farmers were about to make the German aviator pay dearly for his cowardly attempt, when some soldiers who arrived on the scene took him prisoner.

A correspondent of the official Petrograd Agency supplies some details of the affair in which an Austrian aeroplane succeeded in approaching the district where the Czar was holding a review of his troops, on April 12th, near Czernovitz. It was a magnificent spring morning, and the Emperor, accompanied by his Staff, and with General Brussiloff, the Commander-in-Chief of the Forces operating in the South-Western front, was proceeding along the interminable lines of troops saluting each regiment, when suddenly, about eleven o'clock, a cannon shot was heard, followed by what appeared to be either the explosion of a shell or of a bomb. Then a volley of artillery fire followed. One could plainly see in the clear atmosphere the fleecy white balls of the exploding shrapnel fired at the approaching aeroplane. Our batteries were firing from both sides, thus subjecting the enemy machine to a cross-bombardment. The firing soon ceased, and the Emperor concluded his inspection. This enemy attempt produced a profound impression on all onlookers. It was learnt later that at dawn on April 12th some enemy aeroplanes were seen flying towards our lines above the Dniester in the region on Boyane, eight versts east of Czernovitz. They were forced to return by our artillery fire, with the exception of two machines, one of which succeeded in penetrating as far as Ivantz, while the other approached the road where the review was taking place. The Russian anti-aircraft guns drove the Austrian machines away after they had dropped a few bombs.

The *Morning Post* correspondent at Salonica, writing on April 20th, says:—

"To-night General Sarraill gave the Press the following details

with respect to the French aeroplane raids this week. On Tuesday the aviators bombed the enemy camps at Nigorsi and Bogoroditza, on Wednesday the barracks at Ghevgheli and Earen, and to-day the hangars at Nitorsi and the camp at Padagessi, also the station at Strumnitza. The bombs, it was observed, hit the points chosen. All the aeroplanes afterwards returned safely."

In a message written on the following day the *Daily Mail* correspondent at Salonica says:—

"A French airman, starting before dawn, dropped four heavy bombs on Sofia, the Bulgarian capital. The pilot himself says that the projectiles caused fires and a great panic. He returned safely after a non-stop flight of 406 miles."

"French squadrons bombarded the Bulgarian camp at Petrics to-day. German machines are showing great activity, and bombarded during last night and this morning the French camp at Karasuli (on the Vardar) and the camps to the north of the town. They did not cause the least damage or claim any victims."

Mr. A. Beaumont, writing to the *Daily Telegraph* from Milan on the 19th, says:—

"On Monday of last week . . . an Italian dirigible flew over Trent and dropped forty explosive shells on the enemy's depôts and railway lines."

"The Italian anti-aircraft batteries have proved successful in warding off the enemy's aerial incursions against Venice, which has thus been triumphantly protected during a night attack. The Austrians, having failed several times to approach the city of the Doges during the day, made two attempts at night. The moon was shining and the sky was fairly clear when, about 10.20, the alarm was given. Many people were still in the cafés and theatres, but no panic followed."

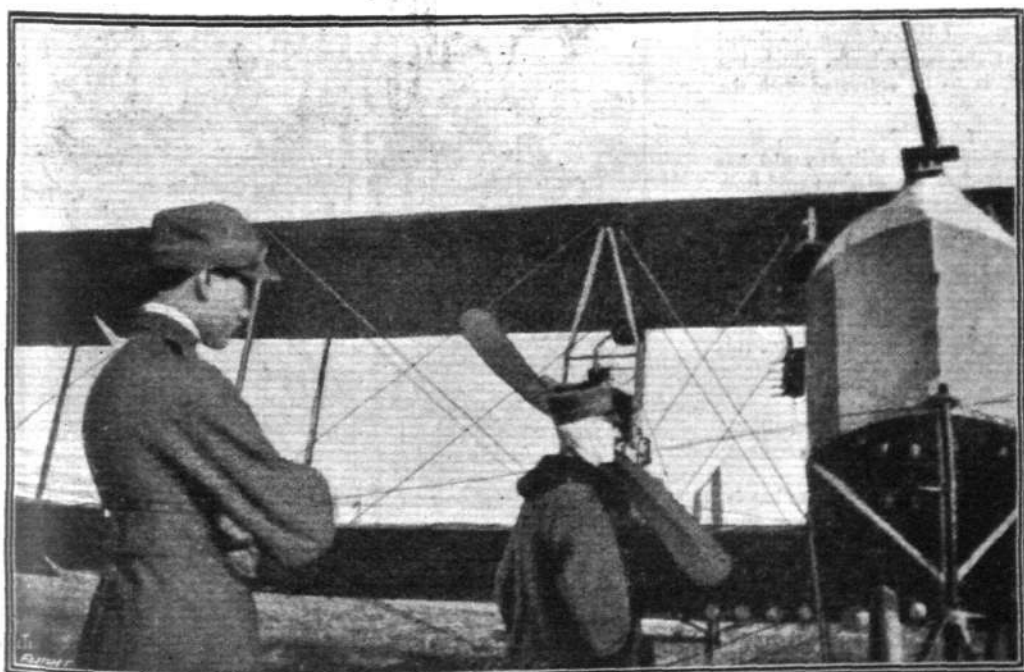
"The sound of the air-defence guns ceased at a quarter past eleven, and the lights were again turned on, and the alarm was over, but half an hour later a second alarm was given. The Austrians were returning to the attack at midnight, and the anti-aircraft guns again became busy. Shrapnel was exploding all over the sky, and the people took cover. At half-past twelve the alarm again ceased, the enemy having been driven off the second time. On this occasion one of his seaplanes was disabled and brought down between Venice and Porto di Cortelazzo, and the officer and pilot made prisoners."

"The same night the Austrians made a surprise attack on Treviso, dropping a number of bombs and killing an aged lady and two of her grandchildren—a little girl of five and a baby of two years—and seven other persons. The aeroplanes were immediately pursued, and one was brought down at Grado, and its occupants captured."

On the evening of the 20th inst. a German air squadron, including a Zeppelin, crossed the Greek frontier, going in the direction of Salonica. It was, however, forced to return by the Allies' gunfire."

Mr. G. Ward Price, writing from Salonica, on Saturday says:—

"An air raid on Sofia, which has notoriously been the bugbear of King Ferdinand, was carried out yesterday. A French aeroplane dropped four bombs on the objectives indicated, and returned safely from its 350 mile journey."



The nacelle and one of the tractor screws of a Caproni biplane. Standing in front of the machine is Capt. Salomone (with a bandage round his head), who, it will be remembered, returned from a raid on Lubiana (Lalbach) with both his passengers killed, he himself being wounded in the head. In spite of his wounds he put up a heroic fight against the hostile machines, and did not return until he had fulfilled his mission and dropped his full complement of bombs. In the photo. he is seen regarding one of his dead comrades who has not yet been removed from the nacelle.

According to an Exchange message from the Piræus, the raider dropped four bombs on the Zeppelin shed at Sofia.

An aeroplane belonging to the Allies has flown over Constantinople and dropped slips of paper announcing the fall of Trebizond, the death of Marshal von der Goltz, and the arrival of the Russians at Marseilles.



MORE RAID FICTION.

THE following "official version" of the series of Zeppelin Raids from March 31st to April 6th has been supplied to the German press. Despite its graphic description, it in no wise differs from similar German propaganda unless it is in the sudden modesty of the final sentence admitting that the damage to warships has not been verified:—

"The attack on the London Docks during the night of March 31st-April 1st far surpassed all earlier attacks in severity and effectiveness. In the north-eastern quarter of the town numerous fires were started, and serious damage was done. The district round Great Eastern Street and Great Tower Street suffered particularly heavily. In this neighbourhood a factory was also burned down.

"Near the Tower Bridge and London Bridge several bombs fell on a transport steamer and severely damaged it.

"At Holland Park several huts and aeroplane sheds, as well as large camps, were hit. Several soldiers were killed here and various aircraft were destroyed.

"The London Docks and St. Catherine Docks suffered severely by the considerable havoc wrought in the adjacent workshops. About 350 workmen were unable to resume work the day after the airship attack, in consequence of the destruction of the works. Four armed merchantmen were also hit here.

"At the West Indian Docks several anti-aircraft guns were silenced, and in the Commercial Docks several warehouses and various small craft were destroyed. The railway was also seriously damaged, and much storage space was destroyed.

"Near the Tilbury Docks a warehouse was burned down and several anti-aircraft guns were damaged.

"At Purfleet a munition factory was hit and destroyed.

"At various places at the mouth of the Humber great fires were started. Near Grimsby we succeeded in destroying a barracks and

A report from Ameland states that seven airships passed north of Ameland on Monday afternoon, going west. Some torpedo-boats also passed, going in the same direction.

A message received at Oosterend, on the island of Texel, from Vlieland, also records that nine Zeppelins passed westwards on Monday.

in hitting a battery. In Grimsby itself widespread destruction was caused. The gasworks, the electric light works, and the suburban railway station suffered seriously. Outside Grimsby one munition factory was destroyed and another was severely damaged.

"Not less heavy is the damage done at the Sunderland Docks. Here in particular the shipbuilding yards of the firm of Swan, Swigham (sic), and Richardson suffered. A ship lying on the stocks fell over, and a cruiser which was ready to be launched was severely damaged. Several ships at the quays were damaged.

"Outside Sunderland several munition factories and sheds containing stores were completely destroyed.

"At Middlesbrough two large furnaces and extensive industrial works were successfully covered with bombs.

"In Edinburgh and Leith, too, the damage is very great. Barracks, munitions depôts, ironworks, and other factories lie in ruins. Two munition works broke out in flames and were destroyed. The large spirit factory was hit by incendiary bombs and was burned to the ground. The railway station was also materially damaged. A train with material was destroyed. In the port several ships were hit; one English four-masted ship was almost completely destroyed, and a transport steamer with war material was so badly damaged that it could not start on its voyage.

"Not less was the damage suffered by places at the mouth of the Tyne. At Haxham a munition factory was destroyed, and at Newcastle a bomb hit the Tyne Bridge.

"Many yards and quays on both banks of the Tyne were hit. In the shipyards at Halborn and Gateshead a whole series of factories and slips have been put out of action.

"Above Newcastle the munition works at Ryton were destroyed.

"According to various reports, new ships under construction for the British Navy were also hit, but about this it is, of course, difficult to ascertain details."



LIGHTER THAN AIR.

"Life is a mirror—smile at it and it will smile back; frown at it and it will frown again."

THE *Daily Mail*, piling up the agony upon its wretched readers, announces that the Germans are now "hatching Zeppelins at the rate of two a week." I believe it is not correct to speak of them as being hatched. The Count blows them with a pipe and a bowl of soap-suds. When he is in good form he sometimes turns out a dozen in a couple of hours.—*Truth*.



It is announced that the care of the great vine at Hampton Court has been taken over by the Office of Works from the Board of Green Cloth. It is rumoured that the latter body, which has been of late somewhat lost sight of, is to be entrusted with the general supervision of our aerial forces.



FOR shouting "The Zepps. are coming!" a Grimsby girl has been fined £1. It was urged in defence that the girl suffered from hallucinations, one of which was that she was a daily newspaper proprietor.



"IN twenty years' time," says Mr. Pemberton Billing, "the aeroplane will bring about universal peace." This statement will come as a distinct shock to many who imagined that with Mr. Billing at Westminster it might be expected to achieve this desirable result in about twenty days.—*Charivaria (Punch)*.



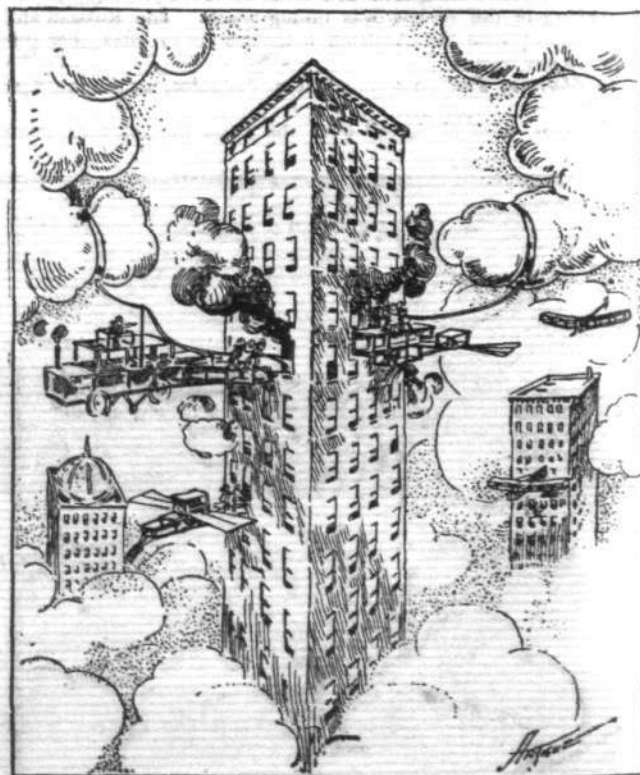
NORAH, fresh from old Ireland, stared at the baby's toy balloon, which wavered at a place two or three feet higher than her head, and was anchored to the back of a chair.

"'Tis quare and wonderful entirely!" she said, raising her hands, "to see it up and balancin' its own self—and it standing on a string!"



FOR over an hour the Zeppelin remained stationery.—*Daily Dispatch*.

Probably on account of its envelope.—*"Whipped Topics."*



Fire Fighting in New York, 1920.—*Aerial Age*.

LEGAL INTELLIGENCE.

Defence of the Realm Act Charge.

AT Dover Police Court on the 20th inst., Mr. Edgar C. W. Middleton appeared on remand on a charge of unlawfully attempting to elicit information with respect to the movements or disposition of the Royal Naval Air Service such as might be of use to the enemy.

Mr. Ernest Chitty, who prosecuted for the Admiralty, repeated the statement that the accused had told officers of the Royal Naval Air Service that he had come down to do a bit of spying for Pemberton Billing, and to get information for the *Daily Mail*, which was running Pemberton Billing.

The Chairman: How many officers did the accused try to pump?

Mr. Chitty said he had only evidence that the defendant asked questions of two officers, but he volunteered remarks to three. Having been in the service, accused knew perfectly well how very strict were the regulations forbidding officers to give any information, and he was leading those officers into very great peril.

Detective-Inspector Moles gave evidence of arrest, and accused's denial of the charge was read over.

Lieut. R. M. Spence, Assistant Paymaster, attached R.N.A.S., said he knew the defendant when in the air service at Dover. He met Middleton about noon on April 12th, and asked him what he was doing in Dover. He replied, "I have come to Dover to do a bit of spying for Pemberton Billing." He asked Middleton what he wanted to know. Accused replied that he (referring apparently to Pemberton Billing) "wants to know if the officers are still quartered about two miles away from the aerodrome, and have to make the journey each meal time." Defendant then asked where he would be likely to meet Flight-Lieut. Cannon, and witness told him if he would come along towards the office he would be likely to meet him going to lunch. On the way the accused gave witness to understand that there was a combination working against Captain Lambe, R.N., as composed apparently of Mr. Pemberton Billing and Mr. Childcott, and Commander Seuter's name was also mentioned in this connection. Middleton said it would not take much more to have Lambe kicked out.

Replying to Mr. Chitty, witness said Captain Lambe was accused's superior officer at the time Middleton was stationed at Dover. Defendant mentioned that he wrote for the *Daily Mail* under the name "Air Pilot."

Cross-examined by Mr. R. D. Muir (defending), witness said Captain Lambe was his own superior officer also. In Captain Lambe's absence witness communicated his conversation with Middleton to Flight-Commander Bromet.

Mr. Muir urged that it was not the accused who asked questions, but witness.

Lieutenant Spence contended that there was questioning by accused.

The flag captain gave evidence as to this case having been investigated by the competent naval authority at Dover, and handed over to the civil authority, with an expression of opinion that it should not be dealt with summarily, but by a jury.

1st Class Air-Mechanic John Kiniple deposed to the accused coming to the seaplane station and asking for Flight Lieutenant Cannon, whom witness fetched.

Flight-Lieut. R. P. Cannon, R.N.A.S., gave evidence that the accused was a friend of his whilst in the service at Dover. When they met outside the seaplane station on April 12th, witness said, "Hullo, Middleton, what are you doing at Dover?" He replied, "I have been sent down to do a bit of spying for Pemberton Billing," or words to that effect. Witness made a suitable statement when Middleton told him that.

Witness: The first part of the statement was simply "You fool," with something in between.

Continuing, witness said Middleton accompanied him to the Grand Hotel to lunch. He there asked whether they still did anti-aircraft patrol. He also asked whether arrangements had been made to quarter the officers elsewhere or at the aerodrome.

Mr. Chitty: Did he mention what Mr. Billing wanted this information for?

Witness: He said it was for questions in the House of Commons. Cross-examined by Mr. Muir, witness said he was quite friendly with Middleton in the service. Their luncheon was not interrupted by the police inspector, as he waited till they had finished coffee. As far as he knew, Middleton had always been loyal and patriotic. Middleton's age was about 21.

Mr. Muir suggested that accused's way of talking of things was the very reverse of restrained, and that he used exaggerated language concerning everything he dealt with. Witness hardly agreed, and Mr. Muir then suggested that the accused talked a little "tall."

Witness: To me he used to.

Mr. Muir: Swank is the word, isn't it?

Witness: No, not swank; he used to have firm opinions on things, and say what he meant. I don't know quite how to express

it. It was not Middleton's habit to understate his views. If anything he overstated them occasionally.

Witness said he did not express a favourable opinion of Mr. Pemberton Billing to Middleton. He told him he did not like Mr. Pemberton Billing's ways of going on.

Mr. Muir: Did he say what his acquaintance with Mr. Pemberton Billing was—whether slight or otherwise?

Witness: He mentioned booming him in the *Daily Mail*.

Cross-examined by Mr. Chitty as to whether he had any reason to think the accused was using exaggerated language when speaking about Pemberton Billing, witness said he took it that the defendant was simply stating an ordinary fact. He was not excited. Witness added that Middleton said either Commander Seuter or Captain Lambe would have to leave the service soon, and he expected it would be Captain Lambe, as he had no Press backing.

Flight-Lieutenant Ryder Young, R.N.A.S., also deposed to Middleton telling him he was working with Pemberton Billing. He mentioned the names of one or two officers, asking if they were still in the Air Service. Accused also said the more power Billing had the less would be Captain Lambe's power.

Detective-Sergeant Hugh Ashley, New Scotland Yard, stated that on April 13th he and Police-Sergeant Haines examined accused's apartment at 11, Woburn Place, London, and there found a number of documents now produced. They included an Admiralty letter, dated December 15th last year, stating that the accused had been found unsuitable for the Air Service, and they regretted they must terminate his appointment as Probationary Flight-Lieutenant. From that date there was also a proof slip, signed "Air Pilot," sent by the *Daily Mail* to the Censor. There was a letter signed by the accused, apparently written to Mr. Pemberton Billing, stating, *inter alia*—

"A few days ago I offered my support in your election campaign, but since that time various facts concerning your past career and present supporters have come to my knowledge, and I cannot now see my way to support you."

A manuscript article was next put in, and Mr. Chitty asked that it should not be read as it contained matters that should not be made public. Two packets of developed films were also put in.

Mr. Chitty remarked that they were films of captive balloons and so on, and, strictly speaking, no civilian should be in possession of them.

The detective-officer said they also found a tape message in cipher. They had not been able to decipher it, and had sent it to the Admiralty.

When formally charged, Mr. Muir, on behalf of the defendant, pleaded not guilty, and reserved his defence.

In asking that the defendant should be released on bail, Mr. Muir said there was not the smallest reason for supposing that the accused ever intended to make use of the information he was acquiring except that it might be put in Parliament as a question. The member for Canterbury (Captain Bennett-Goldney) and Mr. Joynson-Hicks had both been asking the same kind of questions, and had stated that they had been acquiring information in this district on the same subjects. So he supposed the Admiralty would presently have them here to stand their trial with the defendant.

Accused was committed for trial at the Kent Assizes, bail being allowed—himself in one security of £50 and another similar security.



Workers at the R.A.F.

AT the meeting of the Farnborough tribunal on the 18th inst., the point raised by a deputation of workmen discharged from the Royal Aircraft Factory was further considered.

Colonel Henderson, from the War Office, attended, and stated that those workmen who wished might return to their employment and to membership of the R.F.C., while any who preferred to transfer to another branch of the Territorial Force might send their names to the War Office, and they would be posted to available Territorial units. Those who had signed Imperial service forms were soldiers still, and, therefore, were not affected by the Military Service Act as at present constituted. He advised the men who had not so signed to go to the recruiting officer at once; otherwise they would be treated as deserters.

The deputation then raised the point as to their Army pay, since they were still soldiers, and had been out of work for some weeks; this question is to be considered.

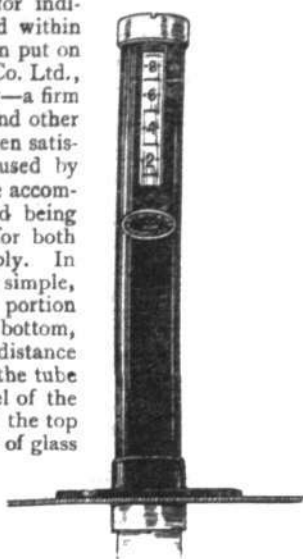
An Air Election Echo.

MR. PEMBERTON BILLING's election expenses at East Herts amounted to £786 7s. 1d. Captain Brodie Henderson's expenses were £1,150 1s. 2d.

Italian Anti-Aircraft Successes.

BETWEEN March 27th and April 12th, 12 Austrian aeroplanes were brought down by the Italians. During the last 11 months only three Italian aeroplanes have been brought down.

A SIMPLE and reliable petrol gauge, for indicating the quantity of petrol contained within the tank on an aeroplane, has just been put on the market by the Cowey Engineering Co. Ltd. of Archer Works, Kew Gardens, Surrey—a firm well known for their speed indicators, and other instruments. This gauge, which has given satisfactory results in practice, and is now used by the Admiralty, is, as may be seen by the accompanying sketch, of the pillar type, and being fitted direct to the tank, is suitable for both gravity and pressure feed systems of supply. In its general principle of working it is very simple, consisting of a strong, stout tube, one portion extending within the tank from top to bottom, while the upper portion projects a short distance outside. Within the lower portion of the tube is a float, which, according to the level of the petrol in the tank, rises or falls, and as the top of the float is exposed to view by means of glass windows let into the top of the tube, the petrol level may be at once ascertained. By pouring known quantities of petrol into the tank, the glass window can be calibrated by gallons or any other system of measurement.



As managerial efforts have been concentrated on getting the equipment of the Midland School of Flying into working order, little has been heard of actual school doings during the last week or so. The time has now been wasted, however, and the arrangements are, we learn, now nearing completion. Of the Blériot type monoplanes with which the school originally started all, except one, have been dismantled. The remaining one, which was built locally, is fitted with a 50 h.p. Gnome, and flies quite well with a passenger. The fuselage tractor biplane under construction is nearly finished, and is expected to prove very useful for advanced pupils, as it will be comparatively fast. This machine is fitted with a 60 h.p. Anzani engine. A Caudron type biplane with dual controls and a 50 Gnome has been acquired during the week, and in addition a batch of six similar machines are under construction at the firm's works at King's Heath, so that there should be no scarcity of school 'buses. The flying ground has now been cleared of all trees and other obstructions, so that it is possible to approach it from any direction, and new hangars are to be erected near some farm buildings which are reached by a good road. With regard to the personal comfort of pupils, arrangements have been made for their accommodation in the residential area adjoining the aerodrome. Several vacancies are available now at the school, and enquiries should be addressed to the Midland School of Flying, Billesley Aerodrome, King's Heath, Birmingham. These improvements, reported by the management, should give them a speedy return for their enterprize.

ARRANGEMENTS had been made for a full programme of flying at the Bournemouth Aerodrome throughout the Easter holidays, but the wind, which is usually but little in evidence, made its presence felt sufficiently to curtail flying very considerably.

A great many people visited the aerodrome on Good Friday, and although, on the ground, the weather conditions seemed favourable, when the pilots reached a height of 300 ft. they found it exceedingly "bumpy."

Nevertheless several interesting flights were made, notably by Mr. Summerfield on a 60 h.p. Arzani-Caudron, climbing about 3,000 ft. and doing some thrilling steep banks and spirals.

School work was resumed towards evening, and many visitors who stayed on the ground witnessed some very smart "straights" and rolling carried out by the pupils under Mr. Summerfield. One lady visitor was taken for a passenger flight.

Saturday afternoon brought another large crowd up to the aerodrome, but the wind again restricted flying, but Mr. Summerfield was up on the 60 h.p. Caudron. Towards evening flying became quite impossible, and the visitors welcomed an opportunity to make a close inspection of the machines, Mr. Summerfield and the mechanics having a busy time explaining the working of the controls.

There was no exhibition on Sunday, but school work was carried out in the early hours.

On Monday the weather conditions were far from ideal, being very showery; there were not so many visitors present as on the two former exhibition days. Mr. Summerfield made a most thrilling flight in a very high wind, handling his machine extraordinarily well under the most adverse conditions. The 60 h.p. Anzani-Caudron was at times pitched almost vertically, and heading the wind the machine made practically no headway.

Aviation in the Japanese Army.

ACCORDING to the Japanese *Aeronautical World*, the Japanese military authorities demanded a million yen for aviation, but the Financial Committee cut this down to 600,000 yen. It is proposed to build twenty new aeroplanes, thus doubling the present equipment. Several new airships are also to be built, and the first is now under construction.

German Submarine Hunters.

GERMAN seaplanes are reported to be busy in the Sound looking out for British submarines and for steamers carrying pit-props. One machine was damaged off Hven on the 17th inst., and had to be towed home by a torpedo-boat.

Fatal Accident in Germany.

THE *Morning Post* correspondent at Amsterdam, writing on April 20th, says that news had been received there that near Wittenberg, in Germany, an aeroplane has fallen to the ground. The occupants, two military aviators, were killed.

PUBLICATIONS RECEIVED.

Aeroplane Design. By F. S. Barnwell, and *A Simple Explanation of Inherent Stability*, by W. H. Sayers. London: McBride, Nast, and Co., Ltd., Rolls House, Bream's Buildings. Price 2s. 6d. net.

Learning to Fly. The Grahame-White Aviation Co., Ltd.,
32, Regent Street, Piccadilly Circus, W.

Quarantining Germany: A Commonsense Precaution. By P. J. Ford. Glasgow: James Maclehose and Sons. Price 1d.

Air-Screws. By M. A. S. Riach. London: Crosby Lockwood and Son. Price 10s. 6d. net.

Catalogue.

"War-Paint." *Land, Sea, and Air.* Robinson and Cleaver, Ltd., 156-168, Regent Street, W.

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Aeronautical Patents Published.

Applied for in 1915.

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